Network 16/6 Controller (Phase 5)
Reference Manual

© Case Communications Ltd 1997

Unit 15, Riverside Business Centre, Victoria Street, High Wycombe, Bucks HP11 2LT
Web: www.casecomms.com Email: sales@casecomms.com
Tel (UK): 08700 263 740 Tel (International): +44 (0) 1494 833 740
Fax (UK): 08700 263 741 Fax (International): +44 (0) 1494 833 741

STATUTORY NOTICES

LITHIUM BATTERY

The lithium used in the battery of this unit will react violently with water and most gases. Discharged batteries must not be crushed, incinerated or disposed of in the normal waste. Used batteries should be collected and disposed of in an approved land fill. The manufacturer and your local waste authority will provide more detailed information about their disposal.

Accidental charging and short circuiting of the battery may cause overheating and possible rupture.

Replace only with the same or equivalent type recommended by the equipment supplier.

MAINS LEAD – IMPORTANT FOR UK USE

The wires in the mains lead of this apparatus are coloured in accordance with the following code:

Green & Yellow: Earth Blue: Neutral Brown: Live

As these colours may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire which is coloured Green & Yellow must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol ⏚, or coloured green, or green & yellow.

The wire which is coloured Blue must be connected to the terminal in the plug which is marked with the letter N or coloured black.

The wire which is coloured Brown must be connected to the terminal in the plug which is marked with the letter L or coloured red.

If the moulded mains plug is removed from the lead of this equipment, the plug must be disposed of immediately.

Czech Republic Safety Statement

Prístroj musí byt umístěn v blízkosti sít'ové zásuvky.

K odpojení přístroje od sítě slouží vidlice sít'ového přívodu.

Case Communications Limited has made all reasonable efforts to ensure the accuracy of the content of this document but the information contained herein does not constitute a warranty of performance of the equipment and/or software described and no specifications given form part of any contract. This document does not constitute a licence to use or copy any software described herein and any such software must only be used in accordance with the terms of the licence supplied therewith.

Case Communications Limited reserves the right to make alterations to the equipment and software described without notice and assumes no liability for any loss or damage caused as a result of use of this document whether because of out of date or inaccurate information or otherwise.

Product and manufacturers' names referred to in this document are used for identification purposes only and Case Communications Limited acknowledges the intellectual property rights of their respective owners in the same.

This document is the copyright of Case Communications Limited and may not be reproduced, copied or stored in any computerised retrieval system by any means whatsoever without the express written permission of Case Communications Limited.

Published by Case Communications Technical Publications Department

Preface

This manual provides reference information and installation instructions for the Network 16 Controller Module and the Network 6 Controller.

Information on the Network 16 Rack, into which the Controller Module fits, is given in a separate manual.

For details on the structure and layout of this manual refer to Sub-Section 3.2.1. This will assist you in setting up and using your Controller.

Terms and Abbreviations

DomainView	Case network management system
IP	Internet Protocol
MAP	Mayze Application Protocol
MLP	Mayze Link Protocol
NMS	Network Management System
SNMP	Simple Network Management Protocol
SLIP	Serial Line Internet Protocol
UDP	User Datagram Protocol
UQPR	Unsolicited Quick Poll Response

Contents

1	**Introduction**	1-1
1.1	The Network 16/6 Controller	1-1
1.2	The Main Features	1-3
1.3	Controller Module User Interface	1-4
2	**Description and Installation**	2-1
2.1	Network 16 Controller Module	2-1
2.1.1	Front Panel Details	2-1
2.1.2	Rear Connection Details	2-2
2.1.3	External Earth	2-3
2.1.4	Installing the Controller Module	2-3
2.2	Network 6 Controller	2-5
2.2.1	Front Panel Details	2-5
2.2.2	Rear Connection Details	2-6
2.2.3	Installing Network 6	2-7
2.3	Self-Testing Sequence	2-8
2.4	Controller's Change to Modem Settings	2-9
2.5	Software Change Note	2-10
3	**Logging On and Main Menu**	3-1
3.1	Logging On	3-1
3.1.1	Initial Logging On	3-1
3.1.2	Subsequent Logging On	3-2
3.2	The Main Menu	3-3
3.2.1	The Options	3-3
3.2.2	The Status Display Line	3-4
4	**Configuring the Controller**	4-1
4.1	Configure Controller (Main Menu Option 7)	4-1
4.2	Configure System Parameters	4-2
4.3	Configure Control Port Parameters	4-6
4.4	Configure System Event Filters	4-10
4.5	Editing the Equipment Identity Table	4-11
4.6	Configure Dial-In Security Table	4-12

5 Configuring the Equipment Channels 5-1
5.1 Configure Channels (Main Menu Option 6) 5-2
5.2 Configuring Channel Parameters 5-3
5.3 Configure Channel Equipment 5-6
5.4 Uploading and Downloading Controlled Channel Configurations 5-7
5.5 Set Channel Event Filters 5-9
5.6 Display a Configuration 5-10
5.7 Copy Channel Configurations 5-11
5.8 Set Empty Slots to Single Channel 5-12

6 Event Logging and Alarms 6-1
6.1 Introduction 6-1
6.1.1 Categories of Events 6-2
6.1.2 Event Classification 6-2
6.1.3 Event Filters and Logs 6-3
6.2 Configure System Event Filters 6-4
6.3 Set Channel Event Filters 6-5

7 Monitoring Your System 7-1
7.1 Display Channel Summary (Main Menu Option 1) 7-1
7.2 Display Single Channel (Main Menu Option 2) 7-3
7.3 View Event Log Files (Main Menu Option 3) 7-7
7.4 Configuring Modem Serial Numbers 7-9

8 Controlling Your System 8-1
8.1 Connect to Channel (Main Menu Option 4) 8-1
8.2 Connect to Remote System (Main Menu Option 5) 8-2
8.2.1 Transparent Connection 8-2

9 Test and Diagnostic Capabilities 9-1
9.1 Tests and Diagnostics (Main Menu Option 8) 9-1
9.2 View Current Tests 9-2
9.3 Equipment Tests & Diagnostics 9-3
9.4 Power-on Tests 9-6

10 Multi-drop Modem Links 10-1
10.1 Support of Multi-drop Links 10-1
10.2 Defining the Number of Multi-drop Sites 10-1
10.3 Multi-drop Configuration Upload/Download 10-2

10.4 Multi-drop Channel Status Upload 10-2
10.5 Performing an RDL on a Multi-drop Site 10-3
10.6 Reverting to Point-to-Point Applications 10-3

11 Network Management 11-1
11.1 Introduction 11-1
11.2 Initial Setup 11-2
11.2.1 Controller Interconnection 11-2
11.2.2 Address Selection 11-3
11.2.3 Event Handling (UQPR and SNMP Traps) 11-4
11.3 Head Controller and Head Printer 11-7
11.3.1 Configure Head Controller Parameters 11-8
11.3.2 Connect to a Remote System 11-9
11.4 SNMP 11-12

12 X.25 Compatibility 12-1
12.1 Introduction 12-1
12.2 VT100 Terminal Application 12-3
12.3 Primary Applications 12-4
12.3.1 Network Management 12-4
12.3.2 Remote Network Management 12-4
12.3.3 MAP Application 12-4
12.3.4 Printer and Alarm Applications 12-4
12.4 Configure X.25 Parameters 12-6
12.5 Configure Control Port Parameters 12-10
12.6 X.25 Diagnostics 12-12

Appendices

A Specification Summary A-1

B Port Specifications B-1
B.1 Network 16 Supervisor and Control Ports B-1
B.1.1 CONTROL 1 B-1
B.1.2 SUPERVISOR B-2
B.1.3 CONTROL 2 B-2
B.2 Network 6 Supervisor and Control Ports B-3
B.2.1 SUPERVISOR B-3
B.2.2 CONTROL 1 B-3

C Cable Specifications C-1
C.1 DTE Ports C-1
C.1.1 DTE Only C-1
C.1.2 DTE plus Command Terminal C-2
C.2 Supervisor and Control Ports C-3
C.2.1 Terminal Cable C-3
C.2.2 Daisy-Chain Cable C-4
C.2.3 NMS or Printer Cable C-5
C.2.4 Synchronous X.25 Cable C-6
C.2.5 Async Alarm or Remote NMS Cable C-7
D System Events D-1

E Channel System Events E-1

F Channel Equipment Events F-1

G Link Options G-1
G.1 Network 16 Controller Module G-1
G.2 Network 6 Controller G-4

H Printer Output Formats H-1
H.1 Verbose Format H-1
H.2 Terse Format H-2

I Application Example I-1
I.1 Configuring Channels used by a Modem and Associated V.25 Parallel Autodialler I-1

J Supported Equipment Types J-1

K Flow Menu Diagrams K-1

Figures

1-1 Example of Interconnected Controllers 1-2

2-1 Controller Module Front Panel 2-1
2-2 Supervisor and Control Ports 2-2
2-3 Controller Front Panel 2-5
2-4 Controller Rear Panel 2-6

6-1	Event Processing	6-1
6-2	Event Filters and Logs	6-3
8-1	Connection to a Channel	8-1
C-1	DTE Data Cable	C-1
C-2	DTE Data and Command Cable	C-2
C-3	Terminal Cable	C-3
C-4	Daisy-Chain Cable	C-4
C-5	NMS/Printer Cable	C-5
C-6	X.25 DTE Cable	C-6
C-7	X.25 DCE Cable	C-6
C-8	Async Alarm or Remote NMS Cable	C-7

1 Introduction

1.1 The Network 16/6 Controller

This manual explains the functionality of both the Network 16 Controller Module and Network 6 Controller.

Network 16 Controller Module is a single card designed for use within the Network 16 Data Communications Management System Rack – it fits into slot 17. It is used as a command distribution and monitoring centre for both local and remote equipment within the network (local equipment is defined as that which is located in the Network 16 Rack; remote equipment is that which is remotely connected to the local equipment).

Network 6 Controller is a standalone unit designed to provide centralised control and monitoring facilities, similar to those of the Network 16 Controller Module, for six local standalone items of equipment and their associated remote units.

Because of the similarity between the two products, this manual makes reference to both under the single name of Controller. Where the products differ, this is explained.

The Controller can support multi-channel equipment. For example, if a two-channel ISDN TA Plus were installed in each of the 16 equipment slots, the Controller can manage the 32 available channels within the one rack.

The principal monitoring functions provide status updates on the individual equipment in each slot, their associated channels and on the system as a whole, by logging and displaying events – which you can classify as 'alarms' or 'monitored' events.

The control functions cover individual equipment configurations, distribution of a command or commands to individual equipment, as well as system configuration and network management.

Controllers may be cascaded together so that any one Controller can manage up to 16 other Controllers (defined as a 'domain') and their local

and remote modems. A Network Management System can also manage the same domain. Figure 1-1 illustrates an example system.

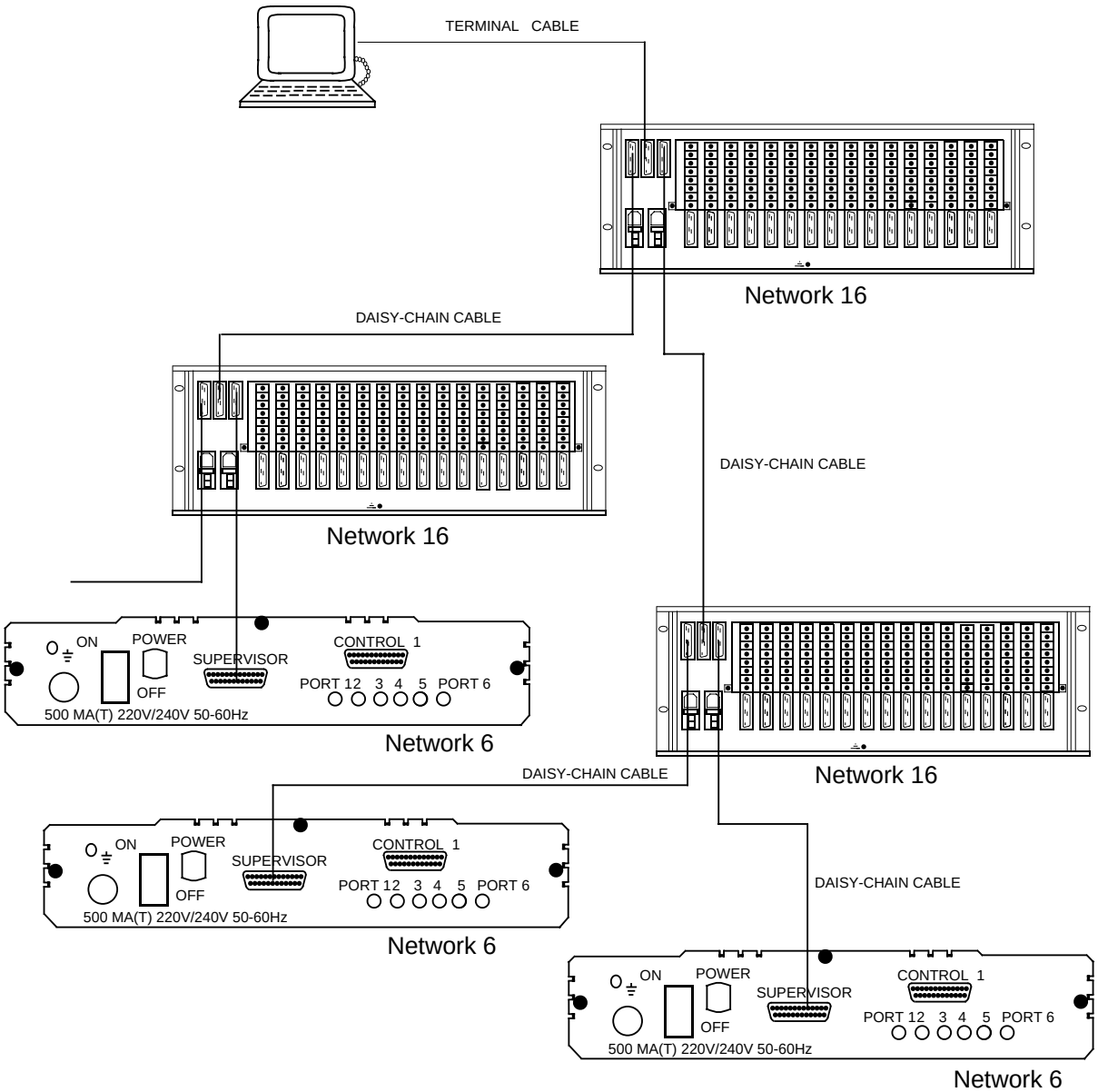


Figure 1-1 Example of Interconnected Controllers

The Controller testing function enables you to make a series of diagnostic tests of any or all the modems in the system.

1.2 The Main Features

The principal features of the Controller are:

- Complete management of all its dial-up and leased line equipment.
- Configuration of its local and remote equipment.
- User-definable alarm and event messages.
- Comprehensive diagnostics and testing of the system's equipment.
- Cascading Controllers to manage up to 16 other Controllers, with their associated local and remote equipment, from a single Controller.
- Management of many Controllers from a Network Management/DomainView System.
- Instant equipment audit facilities.
- Head Controller and Head Printer facility to control a defined domain of Network 16 Controllers for central event monitoring and alarm printing.

Although the Controller is a very powerful and flexible network management tool, it is very easy to install and operate in your system. It is preconfigured to factory default settings, so initially all you need do is log on, set the time, date and Controller serial number, and advise it if it is fitted with one power unit only instead of the factory default of two. Other configuration settings can be altered to suit your system simply by following the menu prompts and the 'Help' screens provided. This manual takes you through the steps of configuring the Controller and the system channels, and then explains the details of its monitoring facilities and control capabilities.

1.3 Controller Module User Interface

The Network 16 Controller Module offers a user interface which is simple to use, making it easy to navigate your way through the menus. Options are included at the foot of many screens – these enable you to make a selection to move directly to your next required screen. This avoids the need to return to the Main Menu each time you want to select a new menu or screen.

In addition to keying the number of the menu option you require, you can make your selection with the angle bracket > cursor which points at the available options. Press the Space Bar and Backspace key to move the cursor down and up respectively, then press **RETURN** or the **ENTER** key to execute the required option.

Note that wherever you are within the menu tree, pressing **TAB** will return you to the Main Menu. Pressing **ESC** will return you to the previous screen.

2 Description and Installation

2.1 Network 16 Controller Module

2.1.1 Front Panel Details

The Controller Module has nine LEDs on the front panel shown in Figure 2-1.

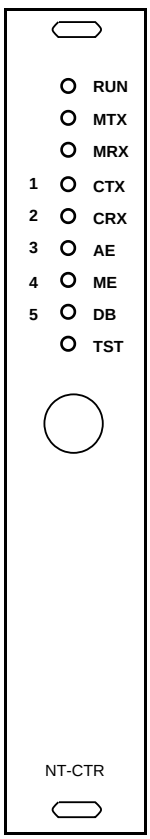


Figure 2-1 Controller Module Front Panel

RUN A continuous light means power is ON and the Controller is running correctly. A flashing light indicates that the processor has failed.

MTX A flashing light indicates that data is being transmitted to any of the modems in the Network 16 Rack.

MRX A flashing light indicates that data is being received from any of the modems in the Network 16 Rack.

CTX A flashing light indicates that data is being transmitted to any of the input/output ports of the Network 16 Rack.

CRX A flashing light indicates that data is being received from any of the input/output ports of the Network 16 rack.

AE Will flash ON for one second when the Controller detects an alarm event.

ME Will flash ON for one second when the Controller detects a monitored event.

DB Will give a continuous light while any of the modems in the Network 16 Rack are operating in dial backup mode.

TST A continuous light indicates that a test is being made by the Controller Module.

The indicators **1** to **5** are used to indicate power-on test results. For further information on their use, refer to Section 9.4.

2.1.2 Rear Connection Details

The Controller Module has an edge connector which mates with a 96-pin socket on the backplane of the Network 16 Rack for all its functions. The Network 16 backplane communications system links the Controller individually to each modem, to the two power supply units, and the three control ports.

Figure 2-2 shows the rear view of Network 16 with the three control ports.

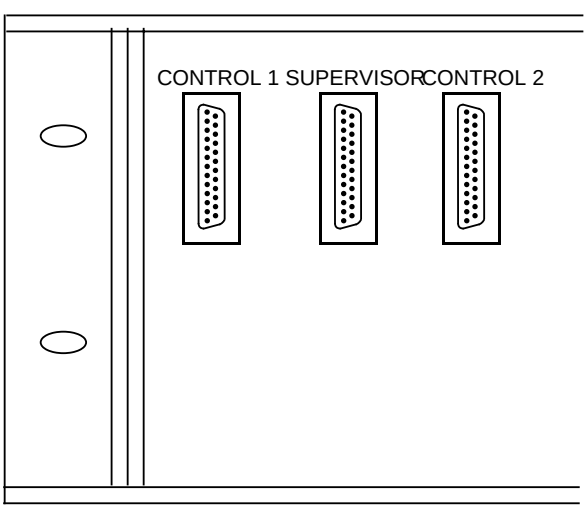


Figure 2-2 Supervisor and Control Ports

SUPERVISOR, **CONTROL 1** and **CONTROL 2** support all asynchronous applications, including VT100 terminal and NMS (network management system). In addition **CONTROL 2** supports synchronous X.25 applications.

If you use a VT100 terminal, it must raise DTR for the Controller Module to recognise it.

CONTROL 1 is also equipped with alarm contacts which indicate Controller 'Alarm' events and power supply failures.

Further details on how to define the function of each of these ports are given in Section 4.3. Pin assignments are given in Appendix B.

2.1.3 External Earth

Your Controller Module should be protectively earthed through the Network 16 Rack's earth tag. Details of the external earth requirements are given in your Network 16 manual.

2.1.4 Installing the Controller Module

Installation should only be carried out by a suitably qualified engineer.

All connections are made to the rear panel of the Network 16 Rack through its backplane socket. Details of how to install your Controller Module are given below. Refer to your Network 16 manual if you require any further help.

1. The power to the Network 16 Rack may be ON or OFF.
2. When viewing your Network 16 Rack from the front, the first sixteen slots from left to right are equipment slots.

   Your Controller must be installed in the next slot – slot 17.

   Remove the blanking plate from slot 17 by undoing the top and bottom retaining screws.
3. Hold the Controller by the central puller on its front panel. Present it to the card guides at the top and bottom of the empty slot, and carefully push it in to mate with the connector on the backplane.
4. Secure the Controller with the screws at the top and bottom of the front panel.

5. Connect your VT100 terminal to the **SUPERVISOR** port on the rear panel of the Network 16 Rack with a 25-pin straight cable (details of this cable are given in Appendix B of the Network 16 user manual).
6. With power ON, your Controller will run a short self-test sequence (indicated by the front panel LEDs flashing on and off), after which the **RUN** LED should remain ON.

2.2 Network 6 Controller

2.2.1 Front Panel Details

The Network 6 has nine LEDs on the front panel shown in Figure 2-3.

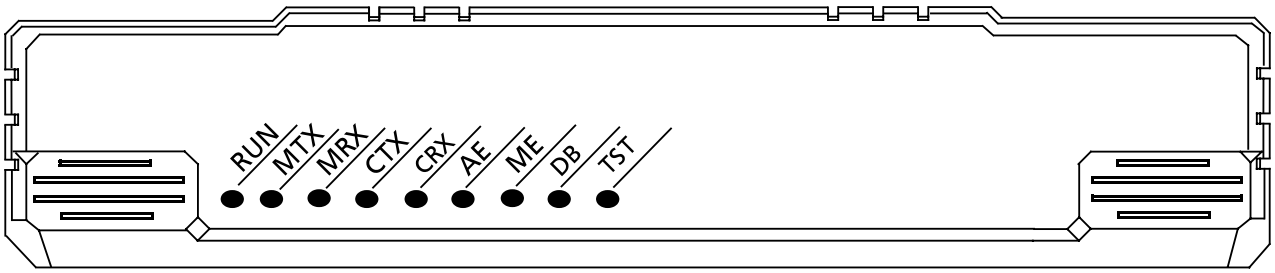


Figure 2-3 Controller Front Panel

RUN A continuous light means power is ON and the Network 6 is functioning correctly. A flashing light indicates that the processor has failed.

MTX A flashing light indicates that data is being transmitted to any of the modems in the Network 6.

MRX A flashing light indicates that data is being received from any of the modems in the Network 6.

CTX A flashing light indicates that data is being transmitted to the Control 1 or Supervisor ports of the Network 6.

CRX A flashing light indicates that data is being received from the Control 1 or Supervisor ports of the Network 6 .

AE Will flash ON for one second when the Network 6 detects an alarm event.

ME Will flash ON for one second when the Network 6 detects a monitored event.

DB Will give a continuous light while any of the modems connected to the Network 6 are operating in dial backup mode.

TST A continuous light indicates that a test is being made by the Network 6.

2.2.2 Rear Connection Details

The rear panel is shown in Figure 2-4.

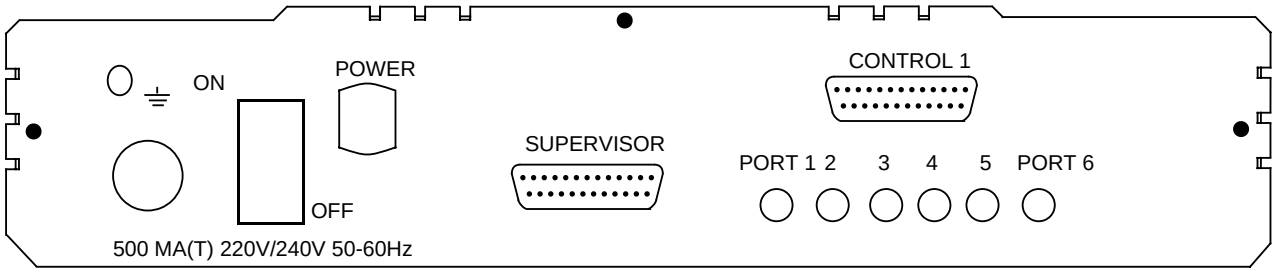


Figure 2-4 Controller Rear Panel

SUPERVISOR Female DB25 connector to your VT100 terminal.

CONTROL 1 Female DB25 connector to your external printer or other equipment.

SUPERVISOR and **CONTROL 1** both support all asynchronous applications, including VT100 terminal and NMS (network management system). In addition, **CONTROL 1** supports synchronous X.25 applications.

If you use a VT100 terminal, it must raise DTR for the Controller to recognise it.

Further details on how to define the function of each of these ports are given in Section 4.3. Pin assignments are given in Appendix B.

PORT 1-6 3.5 mm jack socket for connection to the command port of a modem, allowing you to enter commands or monitor the call progress of up to six attached local modems.

Each of these ports serves a single channel (e.g. port 1 serves channel number 1). The equipment or modem attached to each channel is referred to as the channel equipment.

POWER 2 metre mains cable fitted with a 13 amp plug for connection to a standard UK socket. To isolate the Controller from the power source, the mains plug must be removed.

Fuse 500 mA (T) anti-surge 250V mains fuse. **Caution: Always disconnect the mains before replacing this fuse.** For continued protection against risk of fire, replace only with same type and rating of fuse.

Switch Controller ON or OFF.

Earth For external earthing of your Network 6. *If this is not used, the unit must be earthed through the mains plug*.

2.2.3 Installing Network 6

The Network 6 should be installed close to the socket outlet, which must be easily accessible.

All connections are made to the rear panel of the Network 6 as described in Section 2.2.2. During installation it may be necessary to alter the internal link settings of the Controller. The internal link options are detailed in Appendix G. *(Note: Appendix G is for use of suitably qualified personnel only. Under no circumstances should others attempt to gain access to the equipment; to do so would invalidate the approval.)*

1. Make sure the rear panel mains switch is set to OFF.
2. Using the jack-to-jack cables provided with your Network 6, connect your modems' command ports to the jack sockets numbered 1-6 on the rear panel of the Controller.
3. Connect your VT100 terminal to the **SUPERVISOR** port on the rear panel of the Network 6 with a 25-pin straight-through cable. (See Appendix C for details of this cable.)
4. Power the Controller ON. The Controller's front panel LEDs will flash sequentially during a series of self-tests. The Controller is ready for operation when the **RUN** LED alone stays alight (details of the tests and LED significance are given in Section 9.4).
5. Optionally connect a printer (or other suitable external equipment as described in Section 4.3) to the interface marked **CONTROL 1**. Details of the cable connections are given in Appendix C.

It is important to note that Network 6 requires its associated modems to be powered up in a particular way. This enables them to interwork, which is known as 'Network 6 compatibility mode'. The Quattro SM (QSM) should be powered up with the **ANS** button depressed, whilst all other modems should be powered up with buttons **4**, **2**, and **1** depressed in both cases the ENTER button should be depressed at power-up.

2.3 Self-Testing Sequence

Each time you power ON the Controller it will run a self-test.

First, all the LEDs light up briefly in turn to check that they are working. Then the Controller does a series of self-tests. The status of this sequence is indicated by the LEDs. Section 9.4 gives a listing of the tests performed, along with the corresponding LED pattern.

Should any of these tests fail, your Controller will stop the test sequence and the corresponding LED pattern will continuously flash ON/OFF while the **TST** LED will remain permanently ON. If this happens you should contact your supplier: do not attempt any remedial action yourself.

At the end of the test sequence the **TST** LED will extinguish, leaving the **RUN** LED lit – indicating completion of the tests and readiness to operate.

2.4 Controller's Change to Modem Settings

When using a modem in association with a Controller, the Controller modifies the following AT command settings of the modem command port.

Command

E – Echo
V – Verbose
X – Result Codes
/S – Extended Result codes
&O – Hex/Decimal S-register output
&Q – Quiet Mode

The following cannot be modified on the command port:

&Y – Turn command port off.

2.5 Software Change Note

When you change the software within Network 16, the battery link should be removed and reinserted at least five minutes later to reset the battery-backed RAM. *This will erase all configuration information stored in the Controller*. This must be done with the Controller completely removed from the rack.

3 Logging On and Main Menu

This chapter assumes that you will be using a VT100 terminal as your interface with the Controller.

3.1 Logging On

3.1.1 Initial Logging On

Connect your VT100 terminal to the **SUPERVISOR** port of your Controller, and power it ON. The terminal must be set to 7 data bits, even parity, operating at 300, 600, 1200, 2400, 4800 or 9600 bps (your Controller will autobaud to the correct speed). DTR must be raised; RTS is used as flow control and must also be raised.

To log on to the **SUPERVISOR** port, at your terminal, key:

<CR><CR> (the second <CR> must follow within 2 seconds)

The first time a terminal is logged on, or following a 'hard reset', your screen will display:

```
Connected HH:MM:SS DD/MM/YY  Reference aaaaa - Address 123
There is no Controller Serial Number Stored
Please Enter Serial Number (10 alphanumerics):_
```

The serial number that you are being prompted to enter is user-definable, and you may enter any number that you wish, followed by a carriage return. Your terminal will echo the serial number entered and ask for confirmation:

```
Serial Number is: 1234567890
Please Confirm ('Y'es or 'N'o):
```

Confirm the number by keying **Y**, and your terminal will display your Controller's Main Menu (see Section 3.2).

3.1.2 Subsequent Logging On

If you are logging on to a Controller that has previously been initialised, key:

<CR><CR> (the second <CR> must follow the first within 2 seconds)

Your terminal will display:

Connected to **HH:MM:SS DD/MM/YY** Reference **aaaaa** - Address **123**
Please press RETURN to continue_

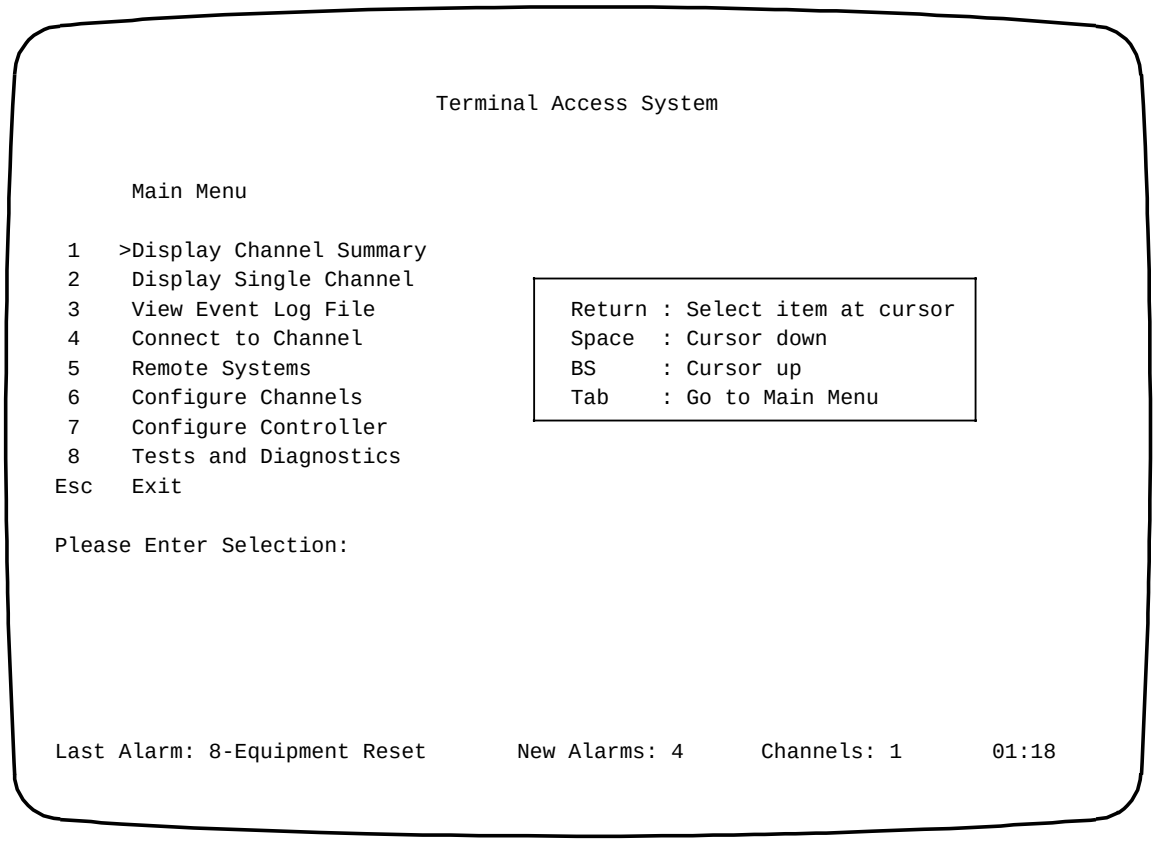
where *HH:MM:SS* is the time in hours/minutes/seconds.
DD/MM/YY is the day/month/year.
aaaaa is the Rack identity (up to 20 characters).
123 is the Rack's address (4 digits available).

(When configuring your Controller, you will be able to reset the time/date/identity. You will be prompted to enable two levels of password control – with either password level enabled, Please press RETURN to continue will be replaced by Please enter password.)

If you are already being prompted to enter a password it is because your Controller has already been security encoded. Contact your system administrator or your supplier for further advice. There are two levels of security available in the Controller, and your system administrator will inform you if the password you have been given will enable complete or restricted access to the Controller.

When logged on, the Main Menu will be displayed.

3.2 The Main Menu



3.2.1 The Options

Your Controller is organised in a similar structure to a family tree: the Main Menu offers you eight different routes that you can take, each route being dedicated to a different Controller function or facility.

Options 1, 2 and 3 on the Main Menu offer you **monitoring** functions:

1 Summary of equipment type or reference name in each channel of the Controller, and last event logged (Section 7.1).
2 Individual channel status giving equipment and event details (Section 7.2).
3 Display of recorded events that have been reported by the equipment for each channel of the Controller (Section 7.3).

Options 4 to 8 on the Main Menu offer you the **control** facilities:

4 Connect the terminal to the required equipment channel (Section 8.1).
5 Connect to remote system via chosen Control port (Sections 8.2, 11.5).

6 Configure equipment channels (Chapter 5).
7 Configure Controller (Chapter 4).
8 Test options (Chapter 9).

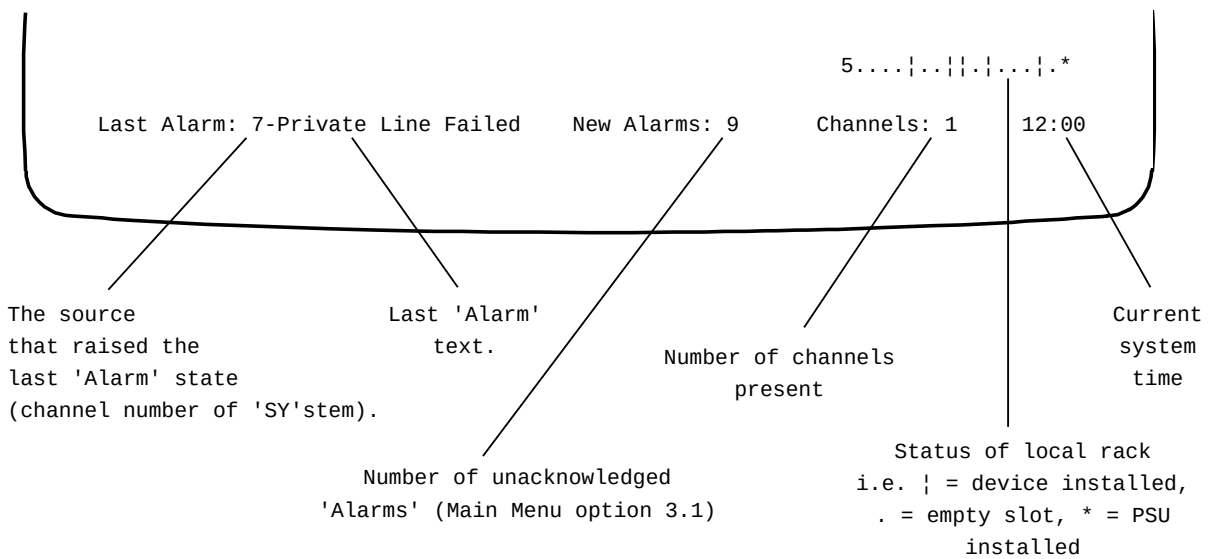
Selecting an option from the Main Menu will usually access a sub-menu which offers you the option to alter, or view, specific options within the chosen function or facility. Selection from this sub-menu will take you to a further sub-menu or directly to an input (editing) screen.

Pressing **ESC** at any time will return you to the previous screen.

As configuring the Controller and the equipment channels is relevant to setting up your system, the manual takes you through those options first. Your system will run on the factory default settings, but you may wish to alter some of them to suit your mode of operation.

3.2.2 The Status Display Line

The status display line at the bottom of the screen is for information only and is explained below.


5....¦..¦¦.¦...¦.*
Last Alarm: 7-Private Line Failed
New Alarms: 9
Channels: 1
12:00
The source that raised the last 'Alarm' state (channel number of 'SY'stem).
Last 'Alarm' text.
Number of unacknowledged 'Alarms' (Main Menu option 3.1)
Number of channels present
Status of local rack i.e. ¦ = device installed, . = empty slot, * = PSU installed
Current system time

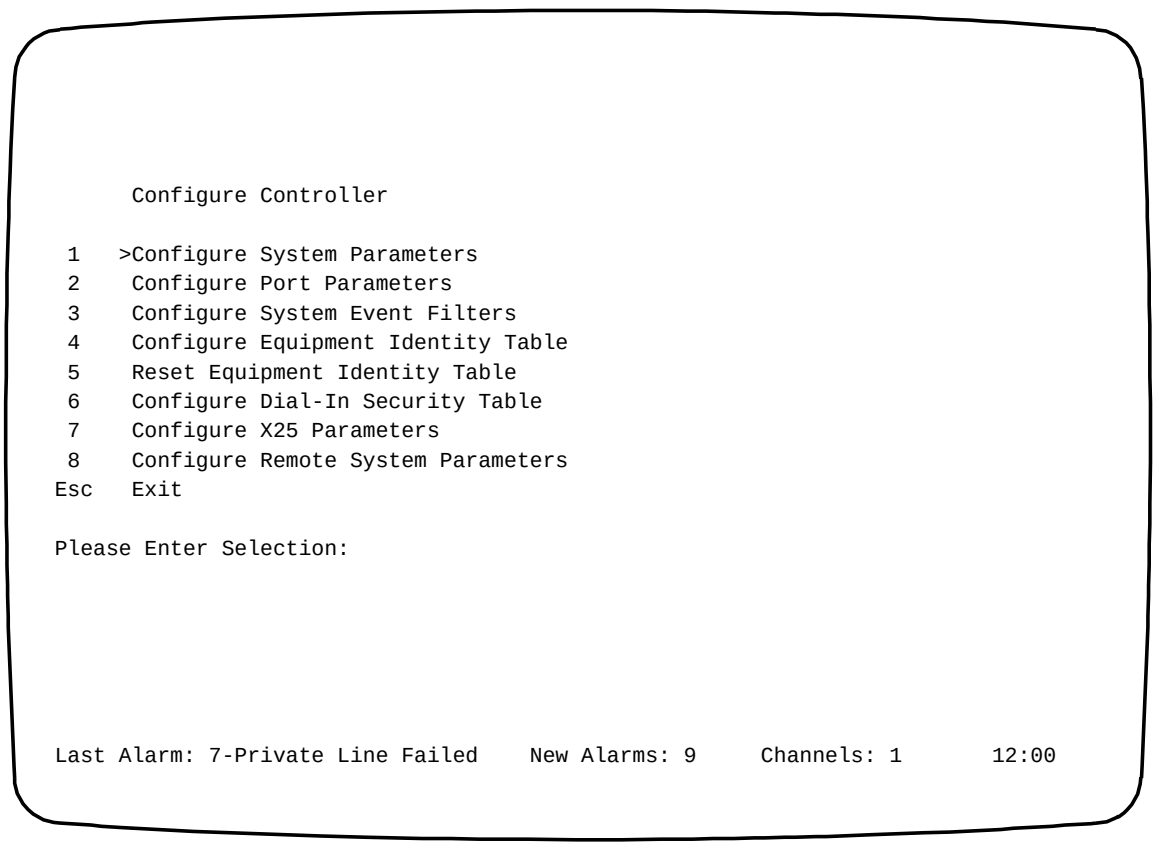
(At this stage it may be reassuring to mention that the term 'Alarm' does not in this case mean a disaster.)

4 Configuring the Controller

4.1 Configure Controller Menu (Main Menu Option 7)

Your Controller has been factory configured to default settings. It is however important that you enter the current time and date, allocate a 'Controller Name' and indicate the correct number of power supply units that are installed in your Network 16.

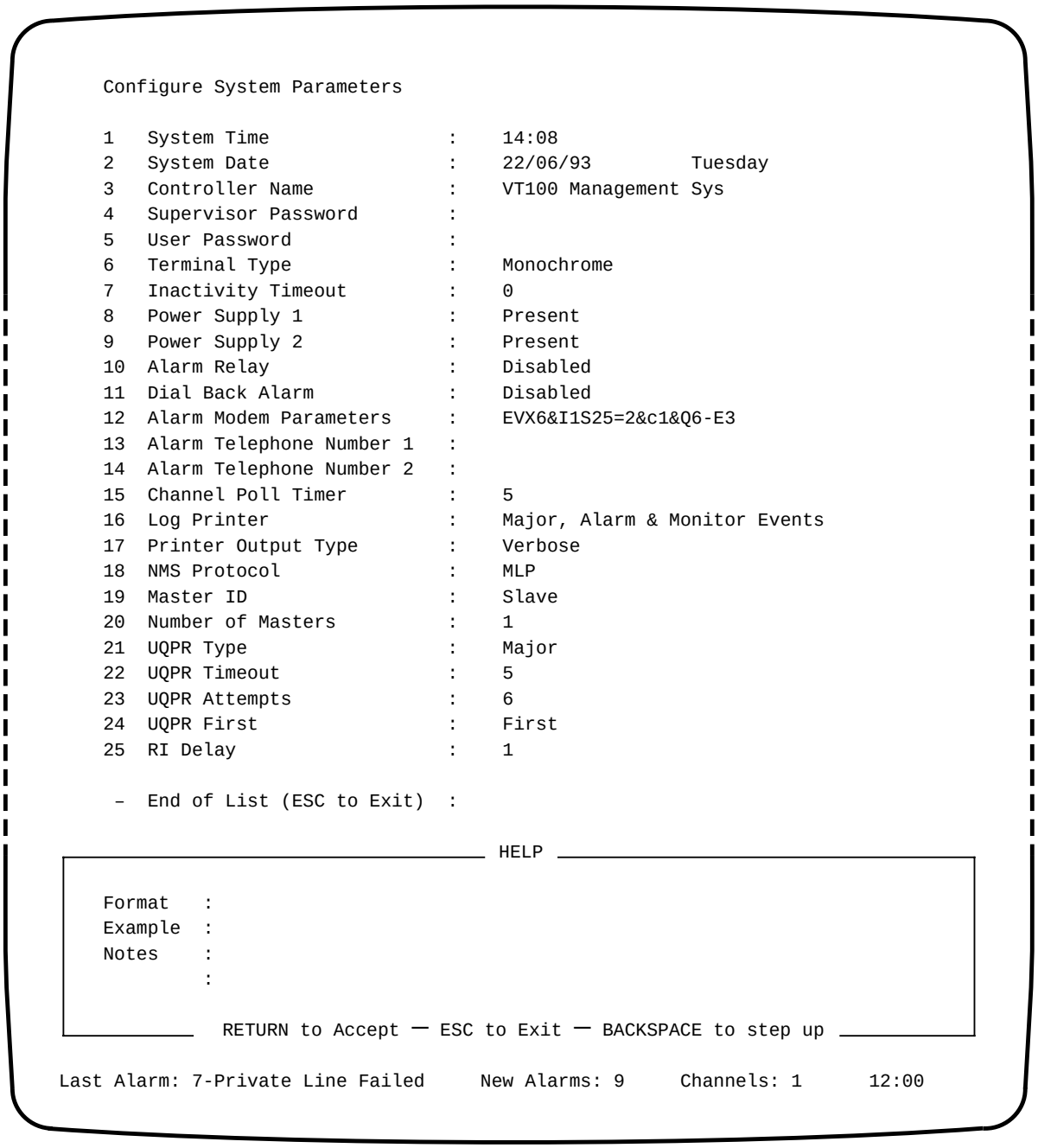
Select Main Menu option 7 to display the Configure Controller menu:


Configure Controller
1 >Configure System Parameters
2 Configure Port Parameters
3 Configure System Event Filters
4 Configure Equipment Identity Table
5 Reset Equipment Identity Table
6 Configure Dial-In Security Table
7 Configure X25 Parameters
8 Configure Remote System Parameters
Esc Exit
Please Enter Selection:
Last Alarm: 7-Private Line Failed New Alarms: 9 Channels: 1 12:00

4.2 Configure System Parameters (Configure Controller Menu Option 1)

Select option 1 from the Configure Controller menu to display the Configure System Parameters screen. There are 25 variable system parameters, although initially only the first of these is visible.

Below is an example of a complete 'System Parameter' list.


Configure System Parameters
1 System Time : 14:08
2 System Date : 22/06/93 Tuesday
3 Controller Name : VT100 Management Sys
4 Supervisor Password :
5 User Password :
6 Terminal Type : Monochrome
7 Inactivity Timeout : 0
8 Power Supply 1 : Present
9 Power Supply 2 : Present
10 Alarm Relay : Disabled
11 Dial Back Alarm : Disabled
12 Alarm Modem Parameters : EVX6&I1S25=2&c1&Q6-E3
13 Alarm Telephone Number 1 :
14 Alarm Telephone Number 2 :
15 Channel Poll Timer : 5
16 Log Printer : Major, Alarm & Monitor Events
17 Printer Output Type : Verbose
18 NMS Protocol : MLP
19 Master ID : Slave
20 Number of Masters : 1
21 UQPR Type : Major
22 UQPR Timeout : 5
23 UQPR Attempts : 6
24 UQPR First : First
25 RI Delay : 1
– End of List (ESC to Exit) :
HELP
Format :
Example :
Notes :
RETURN to Accept — ESC to Exit — BACKSPACE to step up
Last Alarm: 7-Private Line Failed New Alarms: 9 Channels: 1 12:00

By following the screen prompt and the instructions on the 'Help' screen, type in the current time then press **<CR>** to accept the entry, and display the next item. The 24 input items are arranged in hierarchical form. Follow the screen prompts and use the instructions shown on the 'Help' screens to work your way through each of the configuration parameters. Use your carriage return key after each item to sequentially take you through each parameter.

Remember, it is always possible to return to the previous menu by means of the **ESC** key, or press **TAB** to return to the Main Menu.

NOTE: The Network 6 has fewer system parameters: Items 8, 9 and 10 (Power Supply 1, 2 and Alarm Relay) are not available.

The significance of these variable parameters is:

Items 1 and 2. Setting the actual time and date will provide you with a reference for the equipment and system events that you will later select for the Controller to categorise and log (see Section 6.3).

Item 3. Giving the Controller a discrete code will enable you to identify it readily from the VT100 display.

Items 4 and 5. The use of passwords is optional. If you enter characters in either of these two fields you will be prompted for a password every time you attempt to log on to the Supervisor port, and subsequent access will be governed accordingly.

The 'Supervisor' level password gives access to all the Main Menu options of your Controller, including network management facilities and system control functions.

The 'User' level password only gives access to the monitoring functions of the Controller (options 1, 2 and 3 of the Main Menu: option 3.1, acknowledging 'Alarm' events, is not available under this level of password).

Item 6. You should enter the type of monitor you are using – whether monochrome, colour or ANSI.

Item 7. You can define an inactivity period, in minutes, after which the system will log your terminal off the Supervisor port of your Controller. If the value is set to 0, your terminal can only be logged off the Supervisor port if instructed to do so.

Items 8 and 9. (Not used on Network 6.) These entries are *very important*. You should enter whether one or two power supplies are fitted in your Network 16. Only state that both are present if both power supplies are firmly secured in their respective slots.

Item 10. To enable or disable the alarm relay used for audio/visual warning (output on **CONTROL 1**). The alarm relay is activated for 1 second when the Controller detects the occurrence of an Alarm or a Major Alarm event.

Item 11. The dial back alarm (see Section 6.1.2 for a definition of 'alarm'). When the dial back alarm is enabled, one of the control ports of your Controller must be designated as the alarm port. See Section 4.3.

On detection of an event classified as Major Alarm, the Controller will output a message over a modem link (detailed in Section 4.3), or an X.25 link (see Chapter 12).

Item 12. Lists the operating parameters which are sent to the Alarm modem during modem configuration. The default setting for item 12 should not be altered.

Items 13 and 14. You can enter two telephone numbers for remoting alarm reports via a modem external to Network 16. See Section 4.3 and Chapter 7 for further details on remoting Alarms.

Item 15. You can determine the frequency with which the Controller will monitor the equipment channels in order to update each channel's status file. Chapter 7 of this manual details how these status files can be viewed on-screen.

Item 16. Used to determine which events are to be printed out: Major events, Alarm events, Monitor events, all or none. For a definition of Alarm, and details on remoting Alarms to a printer, see Sections 4.3 and 6.1.2).

Item 17. Used to define the printer output in verbose or terse format.

Item 18. Used to select the network management protocol that your Controller will use when communicating as an integral part of a larger data communications system (described in Chapter 11). Selection is between MLP (default) or OSMUX. (When using SNMP this must be set to MLP.)

Item 19. Master ID indicates whether the Controller is running as a slave or as a master (refer to Chapter 11). If set to master, you must select the

ID, that is, Master 1, Master 2 etc. A Controller need be set to master only if it is required to place a call, over the PSTN or an X.25 network, via one of its control ports.

Item 20. Number of Masters reflects the number of Controllers set to master (able to place a call over the PSTN or X.25 networks), within any given group of Controllers, the maximum available being 4.

Items 21, 22, 23 and 24. Reflect the ability of a Controller to generate an Unsolicited Quick Poll Response, the type of event that causes a UQPR to be generated. (Note: only applicable to NMS systems: refer to Section 11.2.3 for details.)

Item 25. This parameter allows you to delay the state change of RI (+ or -) by the set number of 100ms intervals when printing via an async port. When connected via an X.25 PAD this control may be linked to DTR to delay Call Clear and Call Connect invocation between outgoing messages in order to get all of the messages through.

4.3 Configure Port Parameters (Configure Controller Menu Option 2)

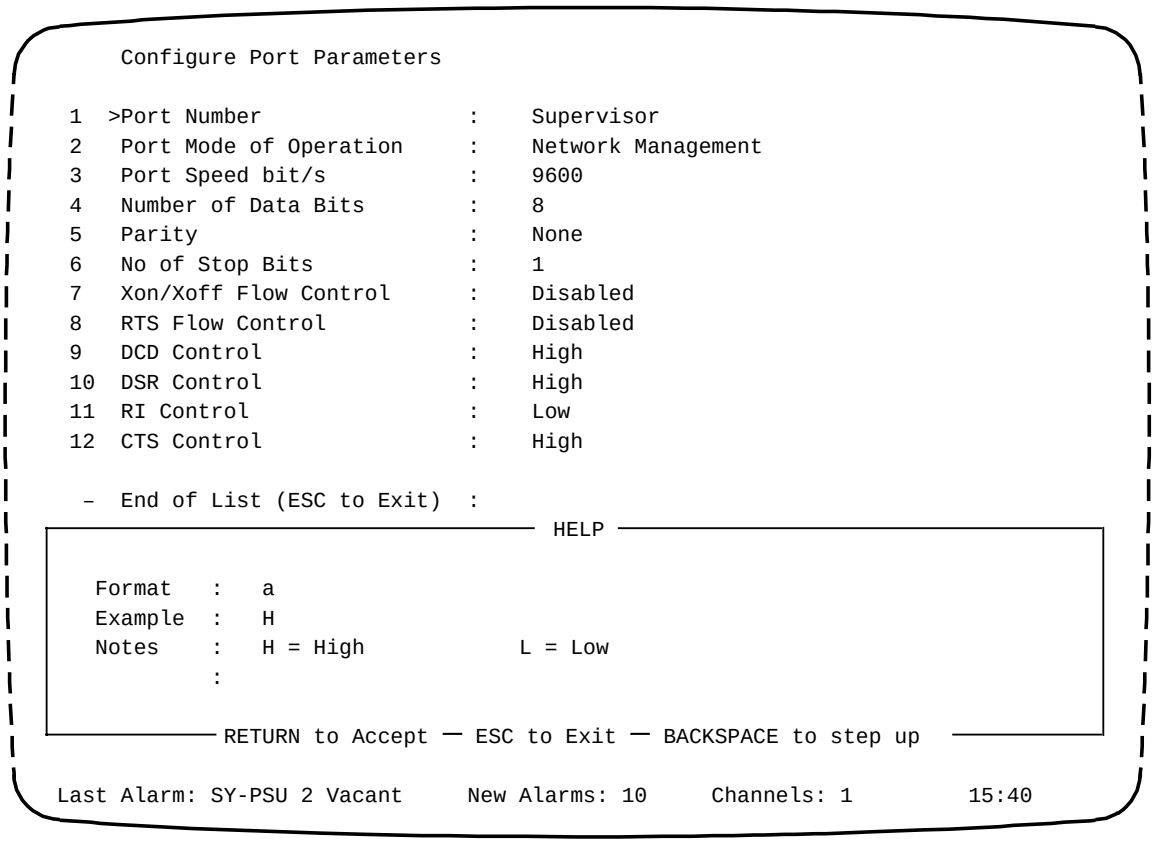
This section is concerned with the ports Control 1, Supervisor and Control 2 (on the Network 6 only Supervisor and Control 1, which is equivalent to Control 2 on Network 16). These are collectively referred to as 'control ports'.

When the Controller is operating, each control port will be in one of two modes: either as access for a VT100 terminal, or in 'primary' mode as defined under Configure Port Parameters menu item 2 (below).

When a VT100 terminal is attached to any of the three ports, it raises DTR on the interface. The Controller recognises this, and automatically sets the port to autobaud (300 to 9600 bps), with 7 data bits, even parity and 1 stop bit, and with all control signals (except RI) high. The Controller will respond to XON/XOFF and RTS flow control. When the user logs off, DSR is dropped for 200 msec. (A port with its primary mode of operation set to 'Remote NMS' will *not* be able to recognise a VT100 terminal when one is attached to that port. All other modes of primary operation *will* allow VT100 recognition.)

If DTR is low (i.e. a VT100 terminal is not connected), the port will operate in 'primary' mode: the speed, number of data bits, parity, number of stop bits, XON/XOFF flow control, RTS flow control, DCD, DSR, RI and CTS control used are determined by settings in the Configure Port Parameters menu.

The complete Configure Port Parameter menu for the Supervisor port is shown below, with the 'Help' screen specific to item 12. The menu items are however arranged in hierarchical form: as with the screen you have just worked your way through (the Configure System Parameters screen), you are initially only presented with the first of the 12 items. Use your carriage return key after each item to take you sequentially through each parameter.


Configure Port Parameters
1 >Port Number : Supervisor
2 Port Mode of Operation : Network Management
3 Port Speed bit/s : 9600
4 Number of Data Bits : 8
5 Parity : None
6 No of Stop Bits : 1
7 Xon/Xoff Flow Control : Disabled
8 RTS Flow Control : Disabled
9 DCD Control : High
10 DSR Control : High
11 RI Control : Low
12 CTS Control : High
– End of List (ESC to Exit) :
HELP
Format : a
Example : H
Notes : H = High L = Low
:
RETURN to Accept — ESC to Exit — BACKSPACE to step up
Last Alarm: SY-PSU 2 Vacant New Alarms: 10 Channels: 1 15:40

The menu for each of the control ports is similar, and should be treated in the same manner.

Item 2. Invites you to define the primary mode of operation for the port. The seven options are: User; Printer; Network Management; Alarm; Remote NMS; MAP. The definitions described here apply to asynchronous operation of the control ports; for synchronous X.25 operation refer to Chapter 12.

User mode. This enables VT100 access to the Controller cards within a daisy chain of Controllers, or to any other asynchronous device. Each port connected in the chain should be designated User. (Refer to Section 8.2 for details on Transparent Connection.)

Printer mode. Allows attachment of an external asynchronous printer to a port defined as 'Printer', to enable you to print a log of all Major Events, Alarm Events, Alarm & Monitored Events, or Monitored Events (depending on the setting of item 16 of the 'Configure System Parameters' input screen, Section 4.2). Refer to Section 6.1.2 for a definition of 'Alarm' events.

The Controller will raise RI (pin 22) and wait for RTS (pin 4) to be raised (if RTS flow control is enabled). If the event has not been printed out within 60 seconds, RI will be lowered and the Controller will try again.

Network Management mode. This allows a network management system access to the Controller card. In a daisy-chain of racks, each port connected in the chain should be designated Network Management.

Alarm mode. Events which you have designated as 'Major Alarms' (Sections 6.4 and 6.5) can be asynchronously routed to any remote station via a modem link attached to a control port that has been designated Alarm mode.

To use this facility you will need:

– A modem that supports AT dialling connected to your Controller.

– Menu item Dial Back Alarm (Configure System Parameters, Section 4.2) enabled.

– The remote station telephone number(s) entered in item(s) Alarm Telephone Number 1 (and Alarm Telephone Number 2) of the same menu.

– The mode of operation of the control port connected to the modem designated as 'Alarm'.

When a Major Alarm event is detected your Controller will first try to dial the number held in Alarm Telephone Number 1 of the Configure System Parameters screen. If there is no reply it will dial the number held in Alarm Telephone Number 2 of the same screen.

On connection, the Controller will relay the event in the format specified under Printer Output Type of the Configure System Parameters menu (item 17).

For further details of how Alarms and Major Alarms can be indicated at a remote site, see Chapter 11.

Remote NMS mode. A network management mode which is capable of sending UQPR events to a remote NMS. The Controller will initiate a call to the NMS on behalf of any Controller within the group (described in Sections 4.2 and 11.2.3). All Controllers within the group must be connected together (see Section 11.3).

MAP mode. In applications where multiple rack addressing is not required, the applications protocol MAP can be used on its own.

4.4 Configure System Event Filters (Configure Controller Menu Option 3)

This menu enables you to edit and reset system event codes so that you can classify events as Alarms, Major Alarms, Monitored Events and Ignored Events.

Chapter 6 of this manual details 'Alarms' and their significance. At this stage we suggest that you ignore this option: your Controller Module will function quite satisfactorily using its factory default settings. You can always return to this option when you have a greater understanding of how your Controller reacts to Alarms and Monitored Events.

4.5 Configure Equipment Identity Table (Configure Controller Menu Option 4)

This menu is a listing, with Controller-recognisable codes, of the currently available equipment for use with your Controller. It will not normally be necessary for you to alter this table; you will however have to update it to accommodate new equipment releases.

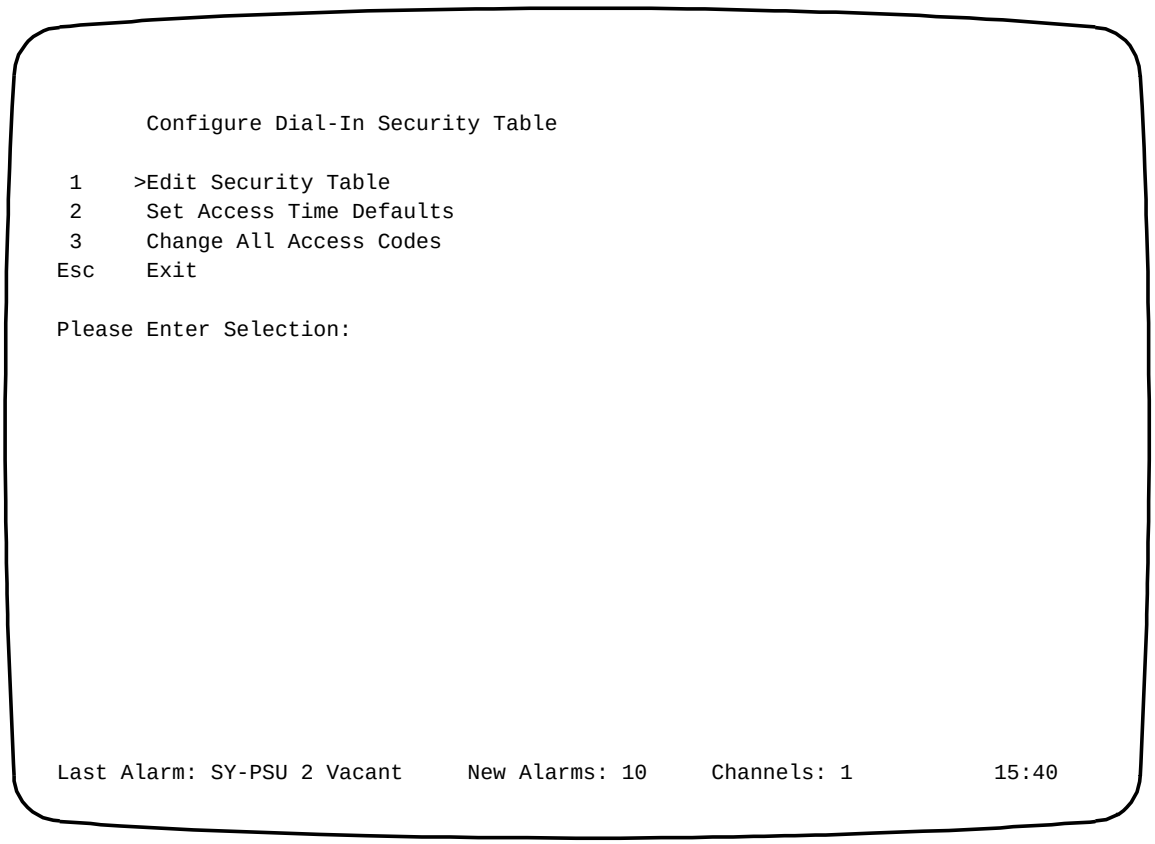
These equipment codes are used to designate equipment identity, as well as available features for the specific equipment. You will only need to refer to it when you wish to restrict an equipment slot to a specific equipment type (Section 5.2).

For correct operation of all the equipment, do not under any circumstances alter any of the settings that are already listed. If by mistake you do alter any of these settings, option 5 of the Configure Controller menu enables you to reset the equipment identity table to the factory default settings.

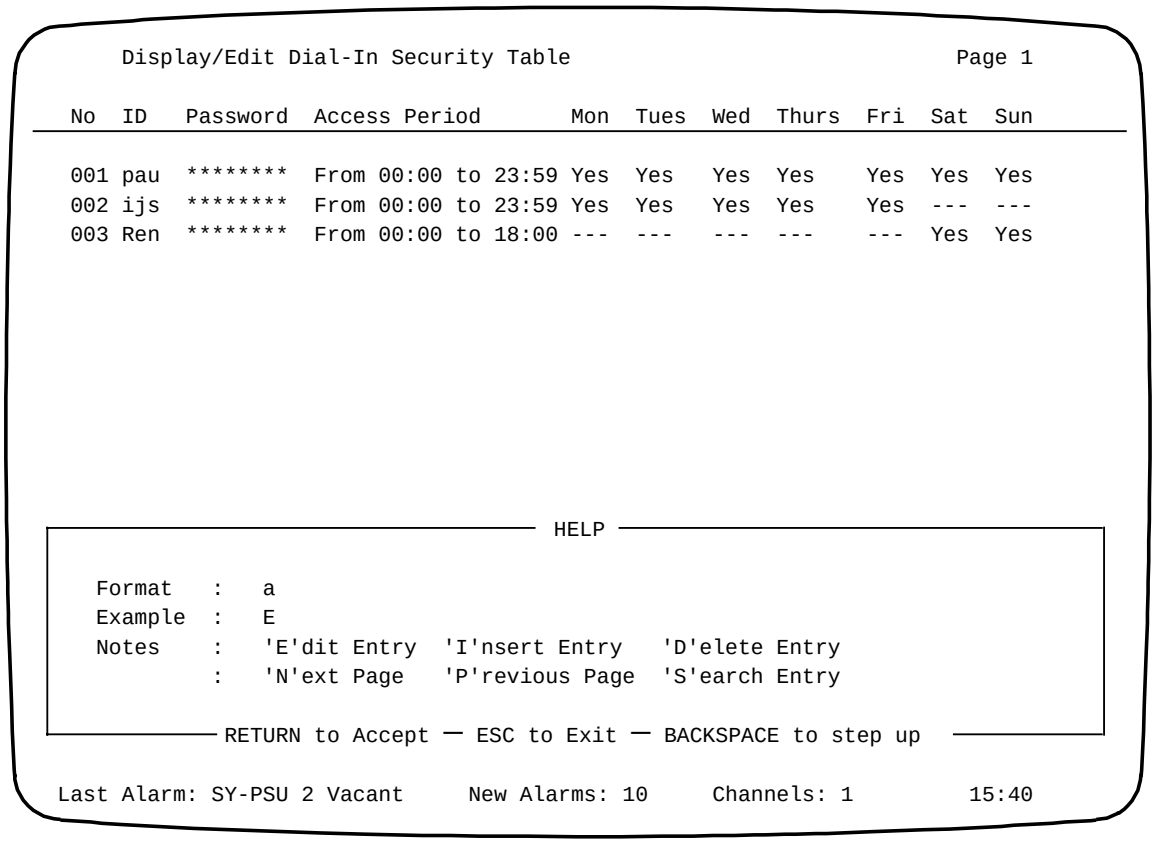
4.6 Configure Dial-In Security Table (Configure Controller Menu Option 6)

Much of the Cray range of equipment offers a Level 2 security option which is designed for operation in conjunction with your Controller. Refer to the equipment manual for further details. The password and user ID of the remote equipment are checked against the Dial-In Security Table of your Controller, and only if a match exists is the link authorised.

Option 6 of the Configure Controller menu enables you to compile and edit the Dial-In Security Table of your Controller.



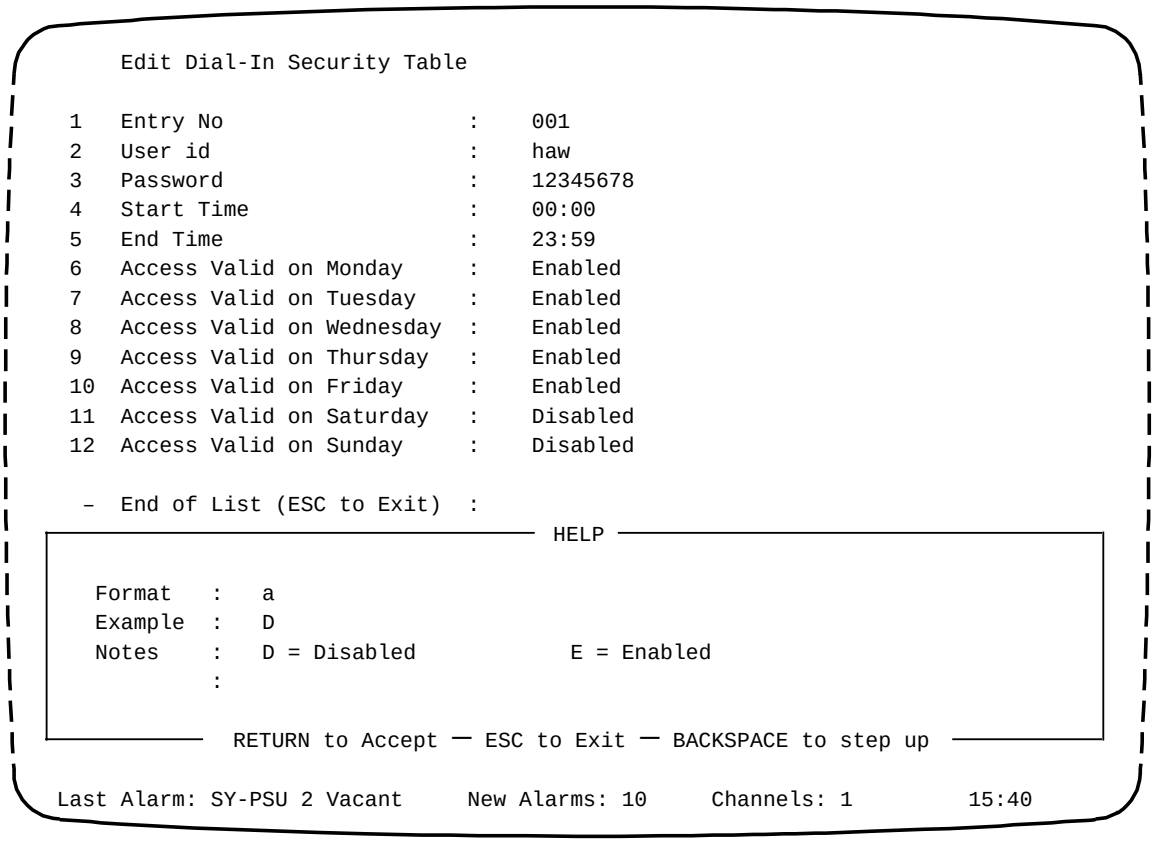
When you select option 1 Edit Security Table the following example screen is displayed:


Display/Edit Dial-In Security Table Page 1
No ID Password Access Period Mon Tues Wed Thurs Fri Sat Sun
001 pau ******** From 00:00 to 23:59 Yes Yes Yes Yes Yes Yes Yes
002 ijs ******** From 00:00 to 23:59 Yes Yes Yes Yes Yes --- ---
003 Ren ******** From 00:00 to 18:00 --- --- --- --- --- Yes Yes
HELP
Format : a
Example : E
Notes : 'E'dit Entry 'I'nsert Entry 'D'elete Entry
: 'N'ext Page 'P'revious Page 'S'earch Entry
RETURN to Accept — ESC to Exit — BACKSPACE to step up
Last Alarm: SY-PSU 2 Vacant New Alarms: 10 Channels: 1 15:40

This screen invites you to insert or edit user entries. The log can contain up to 250 access codes. If you have any doubts about making an entry here, contact your supplier or system administrator. Do not make any entries unless you are certain they are correct.

To select the access code you wish to edit, toggle between entries using the carriage return and backspace keys until the desired entry is highlighted; **S** earch from the help screen will prompt you for the user ID; **N** to look at the next page; **P** to look at the previous page.

Select **E** dit or **I** nsert (a new entry). The Controller will prompt you for: User ID; Password; access start and end time and days valid. Below, the complete menu is shown along with the help screen specific to item 12. As with all other input screens, the items are arranged in hierarchical form: item 1 will initially appear on its own. Use your carriage return key after each item to take you sequentially through the screen. It is always possible to exit back to the previous menu by means of the **ESC** key.


Edit Dial-In Security Table
1 Entry No : 001
2 User id : haw
3 Password : 12345678
4 Start Time : 00:00
5 End Time : 23:59
6 Access Valid on Monday : Enabled
7 Access Valid on Tuesday : Enabled
8 Access Valid on Wednesday : Enabled
9 Access Valid on Thursday : Enabled
10 Access Valid on Friday : Enabled
11 Access Valid on Saturday : Disabled
12 Access Valid on Sunday : Disabled
– End of List (ESC to Exit) :
HELP
Format : a
Example : D
Notes : D = Disabled E = Enabled
:
RETURN to Accept — ESC to Exit — BACKSPACE to step up
Last Alarm: SY-PSU 2 Vacant New Alarms: 10 Channels: 1 15:40

The variable parameters are:

2 User id. A code (containing an alpha and 3 digits, alternatively 3 alpha characters) followed by a carriage return.

3 Password. An eight character alphanumeric code followed by a carriage return.

4 The time during a day when user access, by a modem using this ID and Password, may begin.

5 The time during a day when user access, by a modem using this ID and Password, will end.

Note. If the start and finish times are set to the same as each other (typically 00:00), access will in all circumstances be disabled. (This will not cause a modem to drop a call – only prevent new calls being made.)

6 to 12 Enable or disable access, by a modem using this ID and Password, for each day of the week.

Key **<CR>** after the last entry to return to the Configure Dial-In Security Table sub-menu.

Item 2 Set Access Time Defaults enables you to set a default for the time and day access items, for use with the Edit Security Table input screen. The input screen is similar to that above, with only the Start Time, Stop Time and the seven Access Valid Day options.

Item 3 Change All Access Codes enables you to globally alter time and day access for *all* entries stored in the Security Table. The input screen is similar to that above, with only the Start Time, Stop Time and the seven Access Valid Day options.

5 Configuring the Equipment Channels

The Controller views the equipment it manages as a set of channels.

Channels are displayed (and entered) as follows:

– For single-channel equipment (for example most modems) the channel number is the same as the slot number, 1 through to 16.

– For multi-channel equipment (for example a two-channel ISDN TA) the channel number is 'structured' – the slot number (1 to 16) is followed by a '.', which is followed by the channel number within that slot. For example, DTE 2 of an ISDN TA in slot 7 would be referred to as '7.2'.

The term 'base channel' is used to describe the channel which holds the slot-related configuration parameters. This is the x.1 channel.

The term 'additional channel' is used to describe the extra channel(s) available on multi-channel equipment which share the slot-related parameters configured on the base channel. This is the x.2 (upwards) channel.

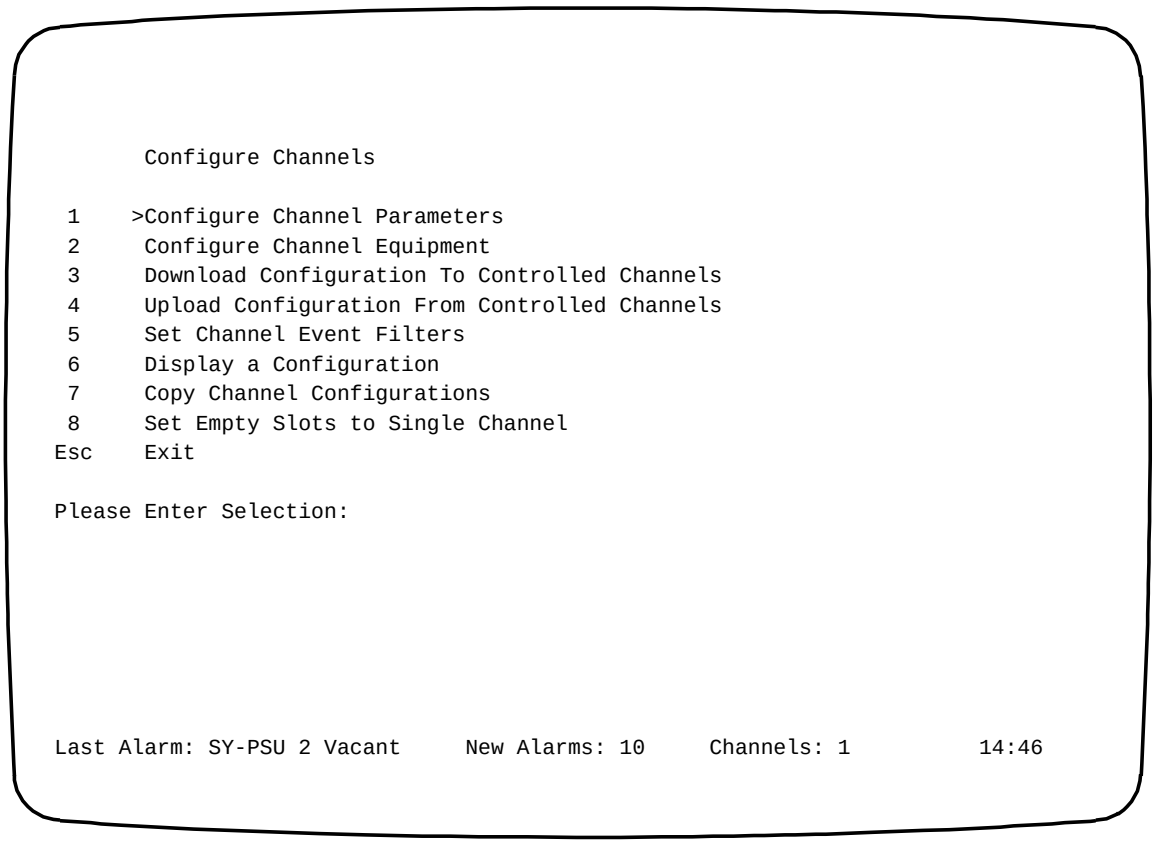
If you wish to enter a channel number for multi-channel equipment, the Controller will prompt you to specify either a base channel or an additional channel, for example, 1.1 or 1.2 etc.

Note that if you take multi-channel equipment out of a slot and replace with single-channel equipment, if you later re-insert multi-channel equipment in that slot the base channel parameters are retained but the additional channel parameters will be lost.

The Network 6 is similar except 'slot' refers to the numbered port on the rear panel.

5.1 Configure Channels (Main Menu Option 6)

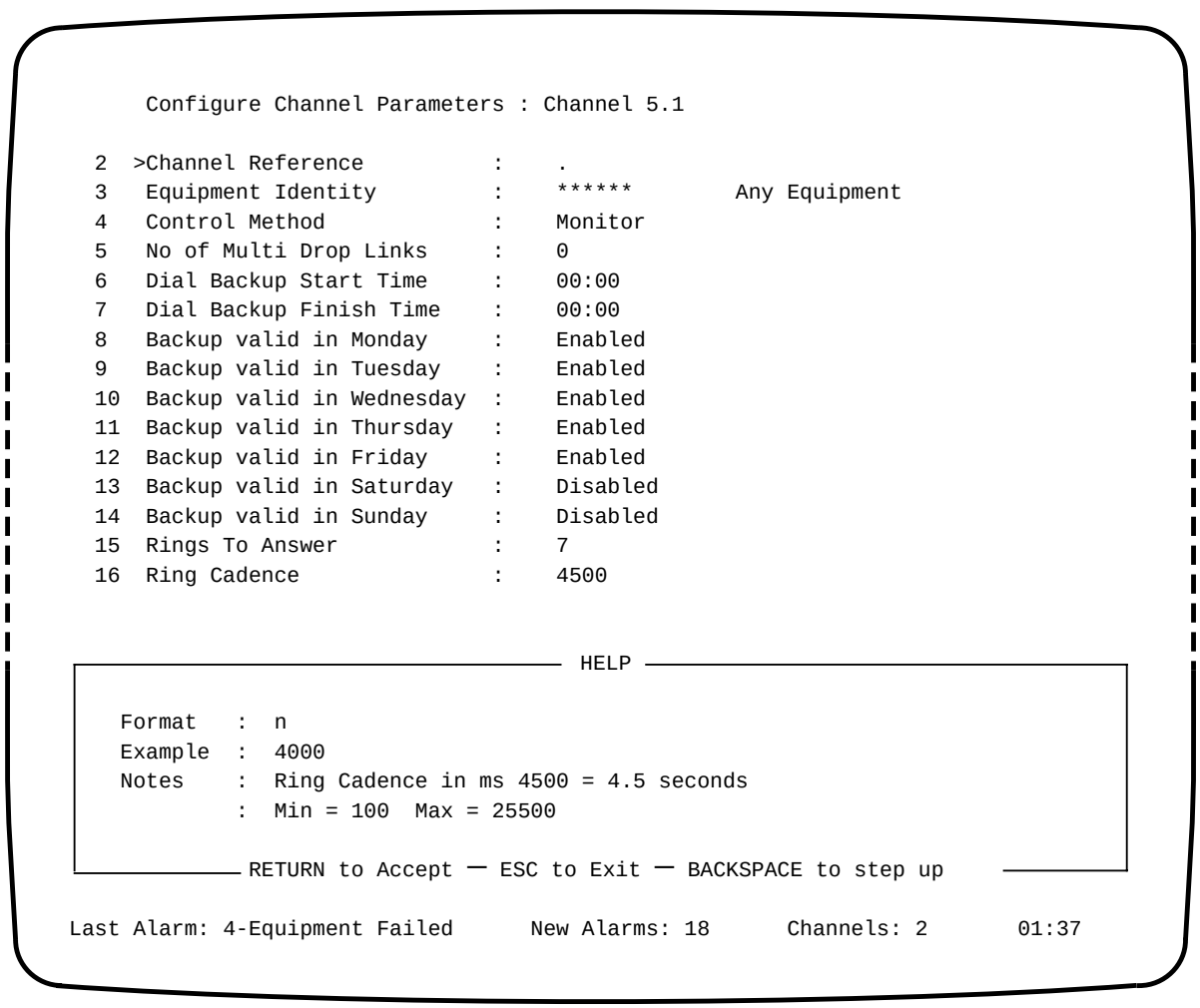
This menu enables you to configure the equipment channels of your Controller.


Configure Channels
1 >Configure Channel Parameters
2 Configure Channel Equipment
3 Download Configuration To Controlled Channels
4 Upload Configuration From Controlled Channels
5 Set Channel Event Filters
6 Display a Configuration
7 Copy Channel Configurations
8 Set Empty Slots to Single Channel
Esc Exit
Please Enter Selection:
Last Alarm: SY-PSU 2 Vacant New Alarms: 10 Channels: 1 14:46

5.2 Configure Channel Parameters (Configure Channels Menu Option 1)

Select option 1 from the Configure Channels menu, to enable you to configure a number of parameters affecting a specified channel within your Controller. You will be prompted for the channel number of the channel you wish to configure.

Below is an example of a complete Configure Channel Parameter screen. As with all other input screens, the items are arranged in hierarchical form to take you through each option sequentially. The screen prompts and 'Help' screens will guide you on formats and available options.


Configure Channel Parameters : Channel 5.1
2 >Channel Reference : .
3 Equipment Identity : ****** Any Equipment
4 Control Method : Monitor
5 No of Multi Drop Links : 0
6 Dial Backup Start Time : 00:00
7 Dial Backup Finish Time : 00:00
8 Backup valid in Monday : Enabled
9 Backup valid in Tuesday : Enabled
10 Backup valid in Wednesday : Enabled
11 Backup valid in Thursday : Enabled
12 Backup valid in Friday : Enabled
13 Backup valid in Saturday : Disabled
14 Backup valid in Sunday : Disabled
15 Rings To Answer : 7
16 Ring Cadence : 4500
HELP
Format : n
Example : 4000
Notes : Ring Cadence in ms 4500 = 4.5 seconds
: Min = 100 Max = 25500
RETURN to Accept — ESC to Exit — BACKSPACE to step up
Last Alarm: 4-Equipment Failed New Alarms: 18 Channels: 2 01:37

(Note that if you specify an additional channel, e.g. 5.2, the Configure Channel Parameters screen is amended to only provide options 2, 15 and 16. The other parameters are slot-related, and therefore shared by all channels in the slot and need only to be configured on the base channel.)

Item 2. Specify the channel's reference name. If the reference name is set to '.' (the default) then wherever the equipment name is used on any

screen, it is replaced by the name of the equipment type (for example Syncro 96).

Item 3. You can restrict the channel to a specific equipment model using an identity code (see Section 4.5 for details of where a list of identity codes can be found). Entering **<TAB>** will automatically fill this field with the equipment type currently present in the channel. Setting this field to other than '******' (the default) will cause an 'Alarm' to be generated if the wrong equipment type is inserted into the slot.

Item 4. Stipulate the control method of the equipment within the specified channel. There are four channel control methods available;

Ignore	The Controller merely monitors whether a card is present or not.
Listen	All events are monitored and logged by the Controller.
Monitor	In addition to 'listening', the Controller periodically polls the current status of the channel.
Control	In addition to 'monitoring', the Controller can upload and download the equipment's configurations (subject to this feature being available on the equipment), and will automatically download the local modem configuration when it is inserted into the slot (if it is the same equipment type and version).

Item 5. Used to determine the number of remote drops that are available, if the channel equipment is to be used at the head of a multi-drop link (see Chapter 10). This item should otherwise be set to 0.

Items 6-14. Used to regulate when dial backup is permitted on the channel (this facility is available on your Controller, but only available on certain modems).

If the start and finish times are set to the same as each other (typically 00:00), the Controller will not modify the current dial backup state (i.e. if it is enabled it will remain enabled, if disabled it will remain disabled). In all other circumstances, when the finish time is reached, the Controller will instruct the modem to drop a dial backup connection (if in operation). When the following start time is reached, the Controller instructs the modem to initiate the dial backup call if the Leased Line connection has not been restored.

Item 15. The maximum number of incoming rings on the modem channel before generating a Ring No Answer event.

Item 16. Ring Cadence, the time in ms between ring tones on an incoming call. This option will have been set to be compatible with regulations in the country in which the Controller is to be used.

5.3 Configure Channel Equipment (Configure Channels Menu Option 2)

This menu enables you to connect your terminal directly to the command port of a specific equipment channel.

When prompted, enter the number of the equipment channel you wish to connect to. Your Controller will then identify the equipment in that channel, and return OK. Your VT100 terminal is now directly connected to the chosen equipment channel. Using AT commands, you can now configure and command your equipment as if there were no Controller present.

When exiting this option, the Controller will automatically upload the local equipment's configuration into the Controller if the control method is set to 'Control' (see Section 5.2). If you use this option be careful not to change channels within multi-channel equipment as the Controller will be unable to follow your instructions.

Note: While connected directly to a channel, the Controller will not monitor events or alarms. These are displayed on your VT100 as messages.

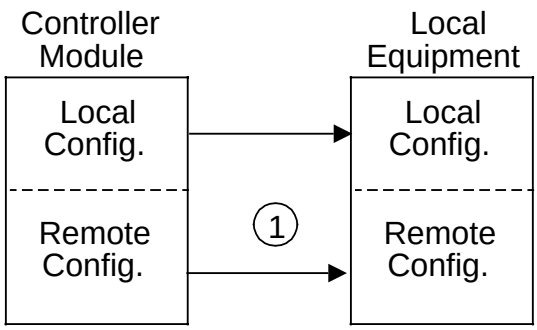
5.4 Uploading and Downloading Controlled Channel Configurations (Configure Channels Menu Options 3 & 4)

These options enable you to download controlled channel configurations from the Controller, or upload controlled channel configurations to the Controller, for the local and remote ends.

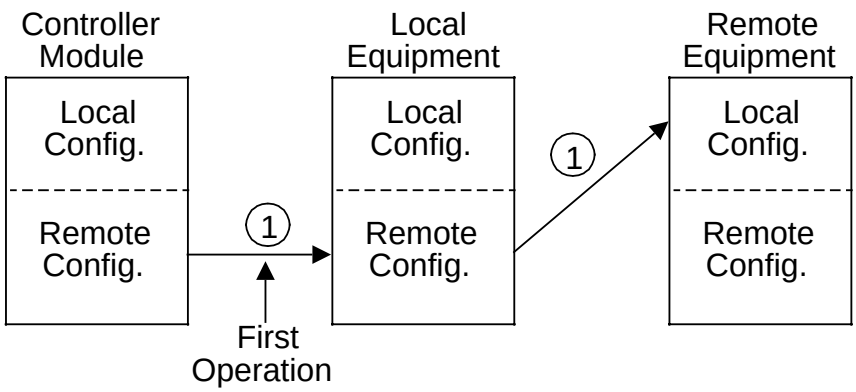
If the channel equipment fitted does not support remote-end downloading and uploading, when you select either 'Download Configuration to the Remote Channel' or 'Upload Configuration from the Local & Remote Channel', the Controller will report Not Supported. If the command is valid the Controller will indicate Actioned. To verify that the up/download has been successful it is necessary to view the event log (described in Section 7.3).

The following operations are supported:

- **Download Configuration to the Local Channel** (Option 3, Item1)

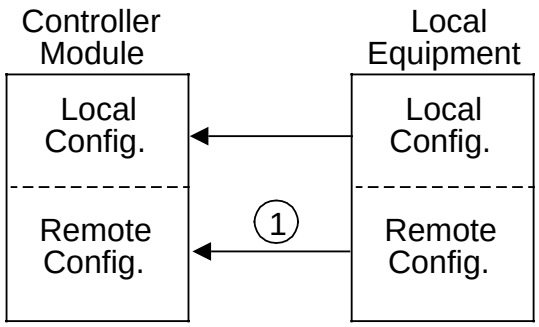


- **Download Configuration to the Remote Channel** (Option 3, Item 2)

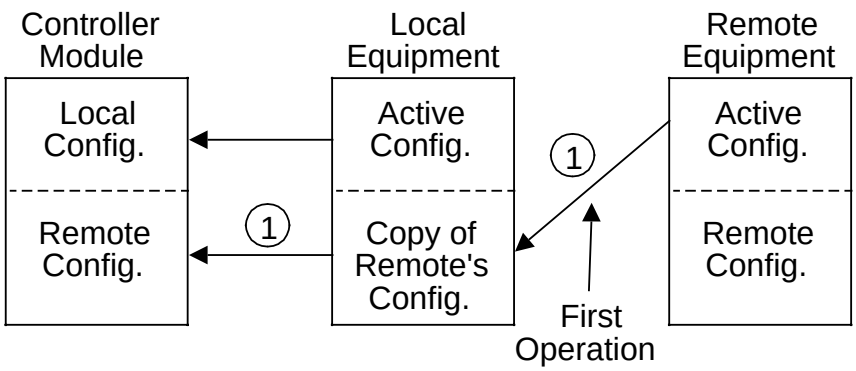


(1) Only if the local equipment supports remote configuration.

- **Upload Configuration from the Local Channel** (Option 4, Item 1)



- **Upload Configuration from the Local & Remote Channel** (Option 4, Item 2)



1 Only if the local equipment supports remote configuration.

Where: local equipment's 'Active Config' is its' current active configuration.

local equipment's 'Copy of Remote's Config' is a copy of the remote equipment's active configuration

the remote equipment's 'Active Config' is its' current active configuration.

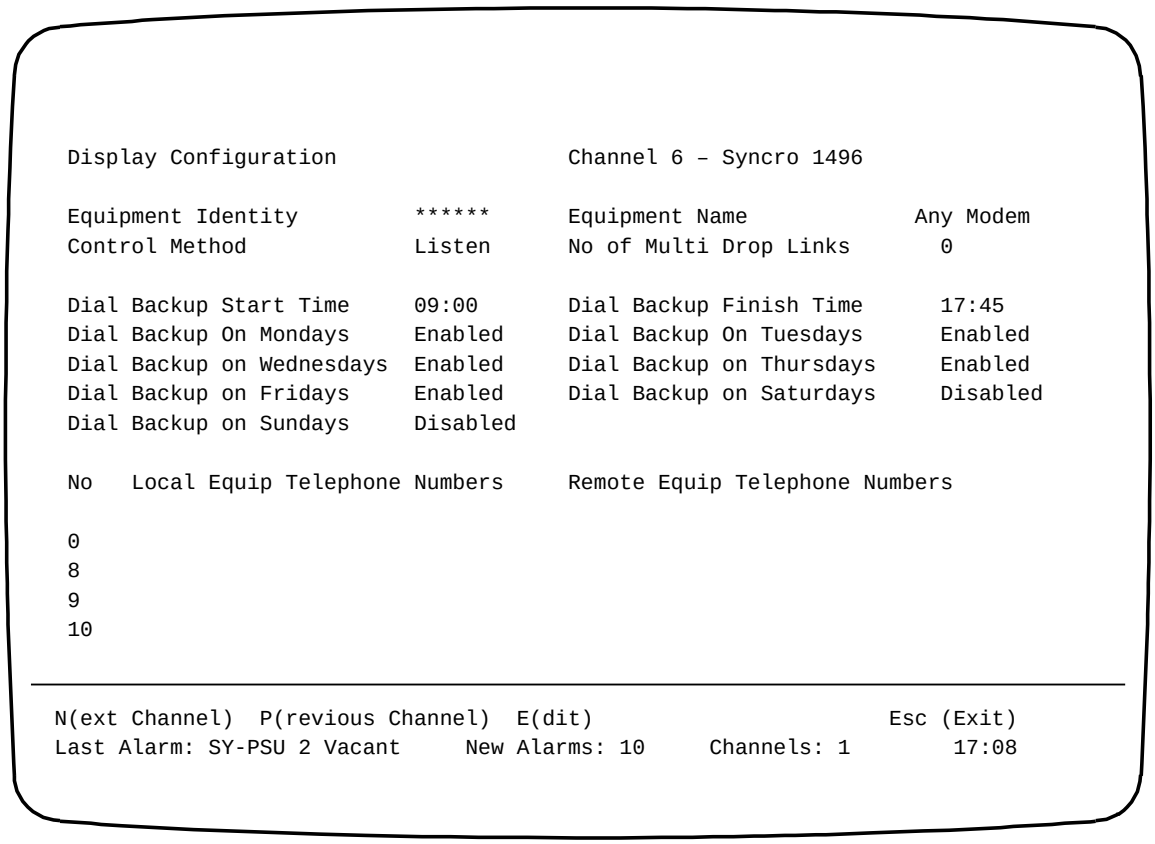
5.5 Set Channel Event Filters (Configure Channels Menu Option 5)

This menu enables you to edit and reset equipment and system event codes to classify them as Alarms, Major Alarms, Monitored Events, or Ignored Events, in both primary or secondary (dial backup) mode.

It is not necessary for you to use this option at present. Chapter 6 of this manual details the use of Alarms, how to classify them and where to view them. We recommend that only after you have read it, and have a greater understanding of the term 'Alarm', should you delve into option 5 of the Configure Channels menu.

5.6 Display a Channel Configuration (Configure Channels Menu Option 6)

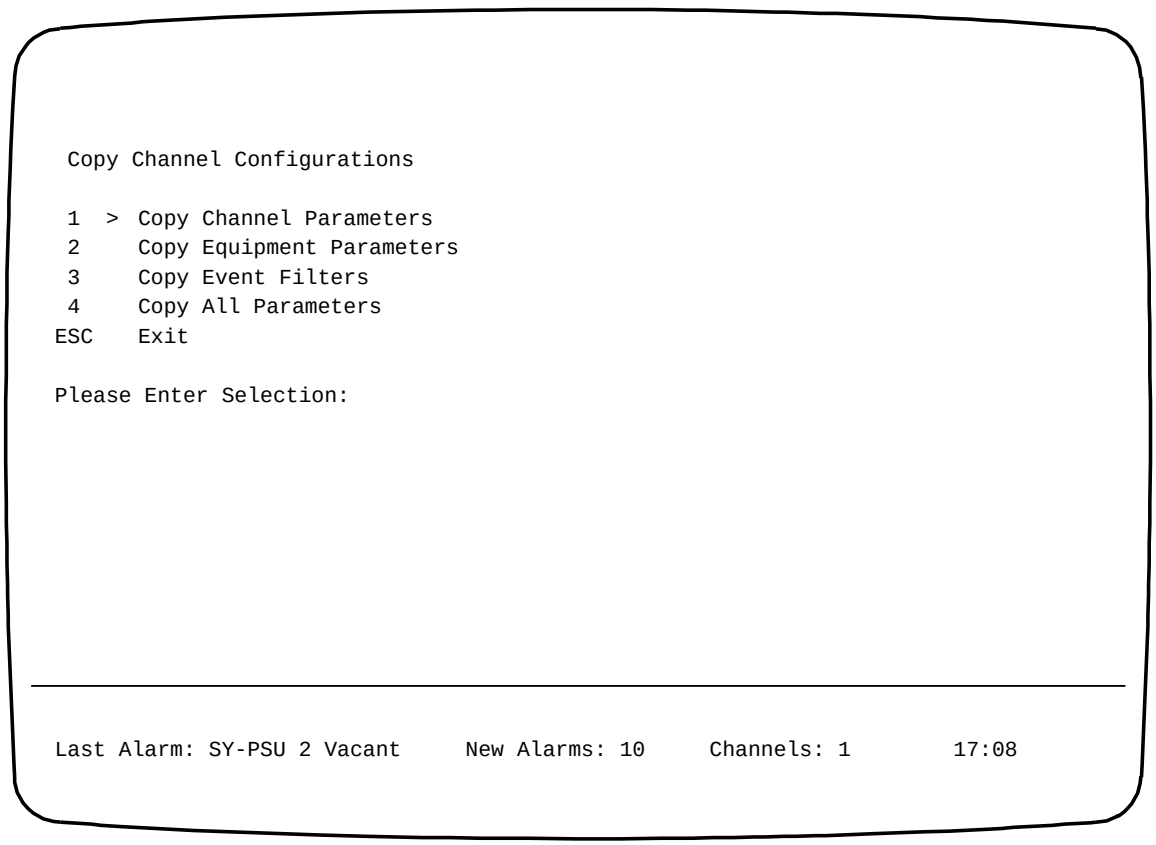
This menu enables you to display the configuration details of any specific channel. An example display is shown below.


Display Configuration
Channel 6 – Syncro 1496
Equipment Identity ****** Equipment Name Any Modem
Control Method Listen No of Multi Drop Links 0
Dial Backup Start Time 09:00 Dial Backup Finish Time 17:45
Dial Backup On Mondays Enabled Dial Backup On Tuesdays Enabled
Dial Backup on Wednesdays Enabled Dial Backup on Thursdays Enabled
Dial Backup on Fridays Enabled Dial Backup on Saturdays Disabled
Dial Backup on Sundays Disabled
No Local Equip Telephone Numbers Remote Equip Telephone Numbers
0
8
9
10
N(ext Channel) P(revious Channel) E(dit) Esc (Exit)
Last Alarm: SY-PSU 2 Vacant New Alarms: 10 Channels: 1 17:08

5.7 Copy Channel Configurations (Configure Channels Menu Option 7)

This menu enables you to copy channel configurations onto other equipment channels. This is a convenient way to set up a system where several equipment channels are to use the same configuration; or to store a configuration during equipment changes.

Note that this affects the configuration stored within the Controller and does not download or upload from equipment channels automatically.



5.8 Set Empty Slots to Single Channel (Configure Channels Menu Option 8)

This menu enables you to reset all empty equipment slots to display as single channel equipment.

This is useful if you remove multi-channel equipment from the rack, as the Channel Summary will still display two channels or more when the slot is empty. This means the Channel Summary will not fit onto one screen and needs to be scrolled with the cursor.

When you select option 8, the screen will not alter, and the reset is performed automatically. When you re-select the Channel Summary you will find the empty slots returned to display single channels.

Note that this will erase any information (including uploaded configurations) stored for the equipment's additional channels (2 and above).

6 Event Logging and Alarms

6.1 Introduction

The principal monitoring functions of your Controller Module give you status updates on the system (Controller, power supply units etc) and on individual equipment slots, by logging and displaying 'events'.

This process is illustrated in Figure 6-1 and explained in the following subsections.

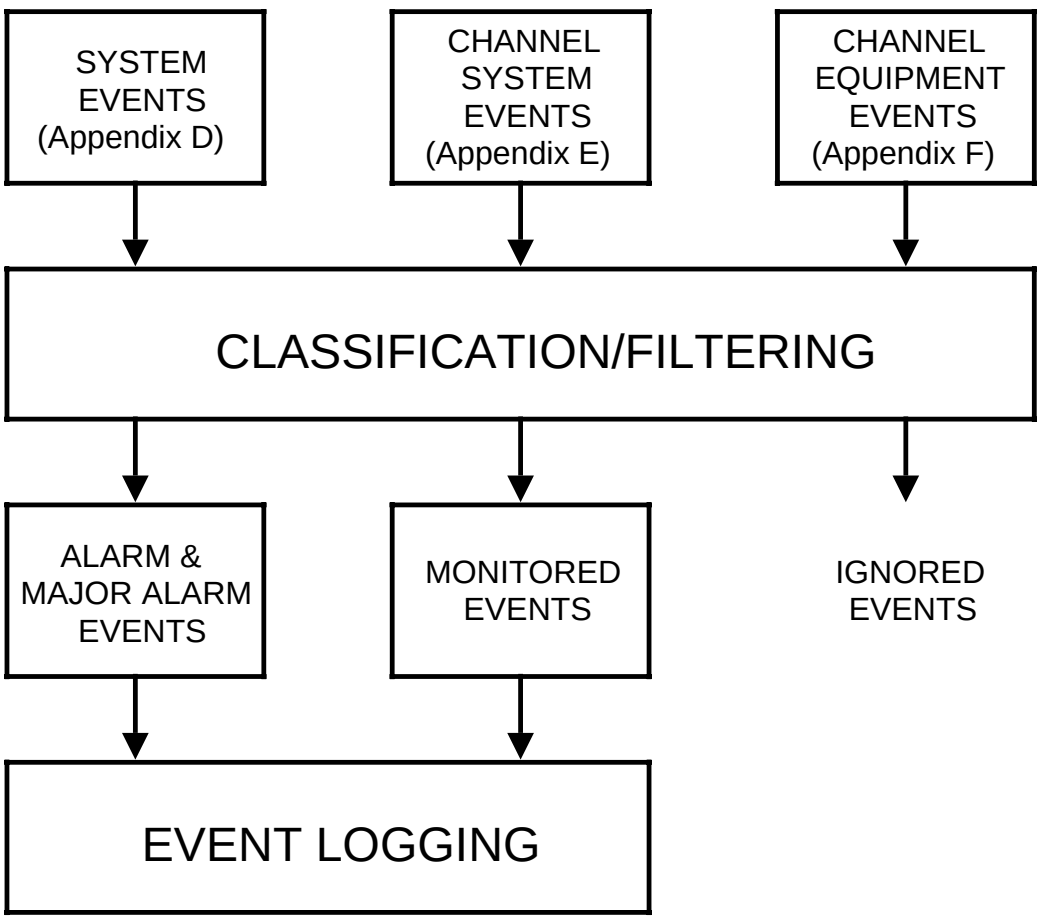


Figure 6-1 Event Processing

6.1.1 Categories of Events

There are three categories (sources) of events. These are:

Overall system events (Section 6.2)
Channel system events (Section 6.3)
Channel equipment events (Section 6.3)

You can decide how you want events within these categories classified.

6.1.2 Event Classification

You can decide which of the following classifications you wish to assign to each event.

Ignored Events are those which you have elected not to record, and therefore are not brought to your attention in any way.

All other events are logged and are available for inspection under Main Menu item 3 (see Section 7.3) and fall into one of the following three classifications:

Alarms are events which the Controller can bring to your attention by several means:

- By displaying at the bottom of each screen the latest alarm event which occurred, and the number of alarm events which have occurred and not been acknowledged by you. The details of these unacknowledged alarms can be found in Main Menu item 3, View Event Log Files (see Section 7.3).
- By printout – if a printer is connected to one of the control ports of the Controller (the port's mode of operation must be defined as 'Printer', see Section 4.3).
- By audio/visual signal through the relay in the Controller.

Major Alarms are special case alarm events, which can be brought to your attention in the same way as an 'Alarm' event, but can also be sent to a remote printer via a modem (the control port's mode of operation must be defined as 'Alarm', see Section 4.3).

Monitored Events can also be sent to a local printer, but are not otherwise brought to your attention.

6.1.3 Event Filters and Logs

When you have classified the event, the Controller filters and logs them as they occur. It holds a separate log of the last 20 events of each individual equipment slot and of the system, as well as a consolidated log of the last 150 Alarm events and 250 Monitored events. When the logs are full the Controller substitutes additional events for the oldest on each log.

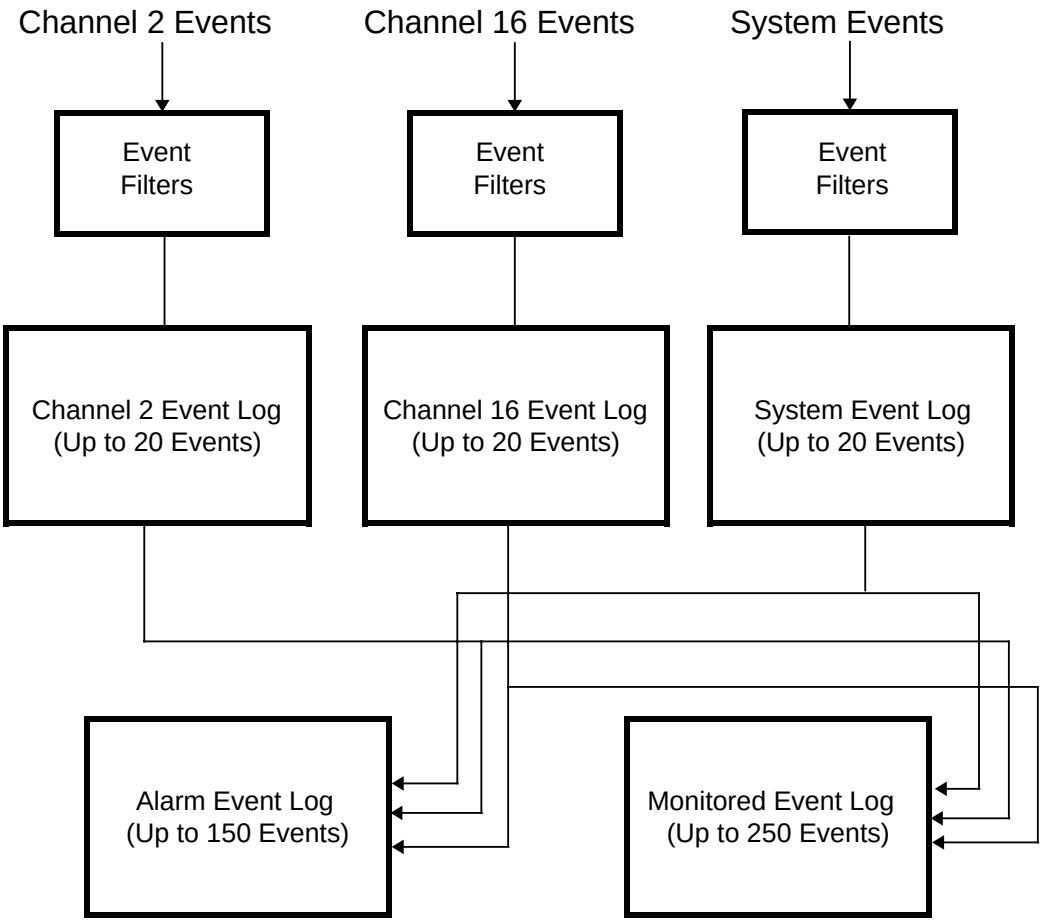

Channel 2 Events
Channel 16 Events
System Events
Event Filters
Event Filters
Event Filters
Channel 2 Event Log (Up to 20 Events)
Channel 16 Event Log (Up to 20 Events)
System Event Log (Up to 20 Events)
Alarm Event Log (Up to 150 Events)
Monitored Event Log (Up to 250 Events)

Figure 6-2 Event Filters and Logs

All these logs can be accessed through the Main Menu item 3, View Event Log Files (see Section 7.3). Alarms are segregated into 'acknowledged' and 'unacknowledged', and may be displayed as 'Unacknowledged Alarms' or 'Alarm Events'. Monitored events are shown as 'Monitor Events'.

6.2 Configure System Event Filters (Configure Controller Menu Option 3)

This menu enables you to edit and reset system event codes whereby you classify events as 'Alarms', 'Major Alarms', 'Monitored' and 'Ignored' Events.

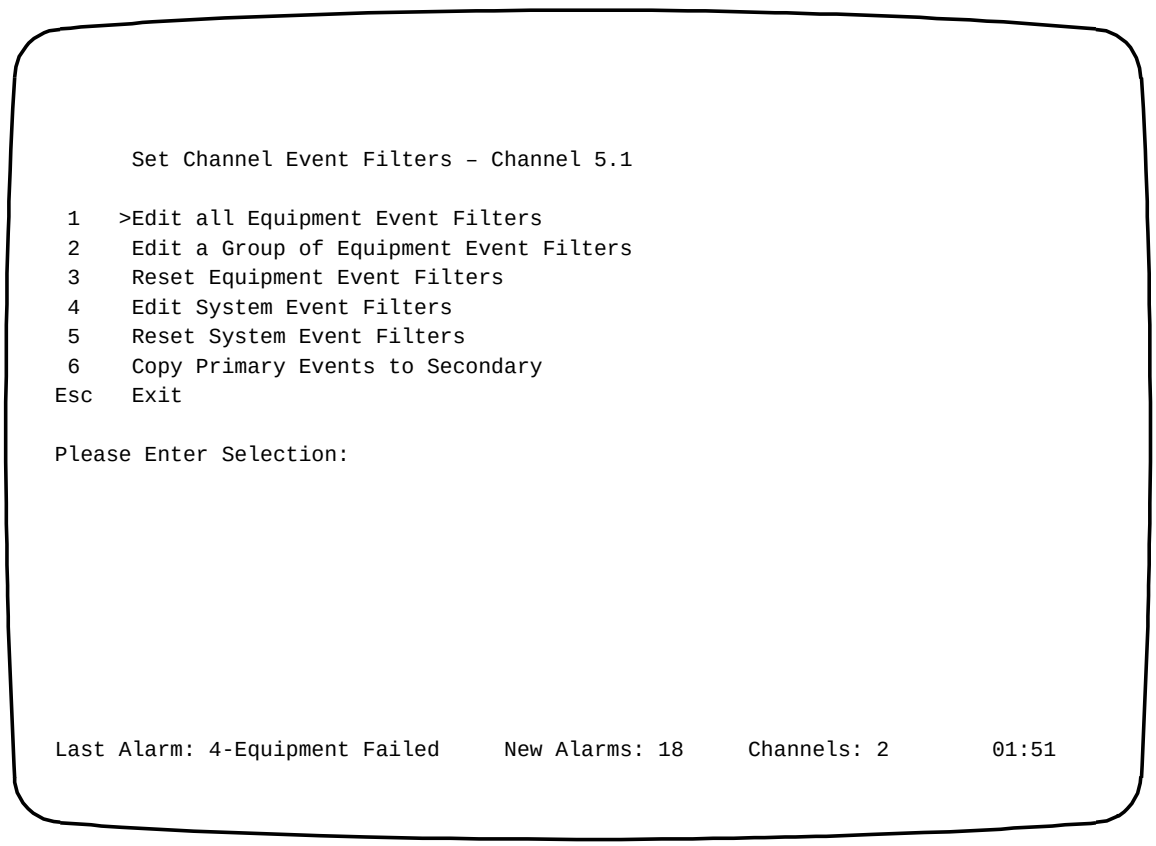
You may select the event you wish to edit by entering its numeric code, or simply scroll through the list using the Return key.

See Appendix D for a listing of the system events. Section 7.3 of this manual explains how to view the event logs.

6.3 Set Channel Event Filters (Configure Channels Menu Option 5)

This menu enables you to edit and reset channel equipment and channel system event codes to classify them as 'Alarms, 'Major Alarms', 'Monitored' or 'Ignored' events in both primary or secondary (dial backup) mode. A listing of the events can be found in Appendices E and F.

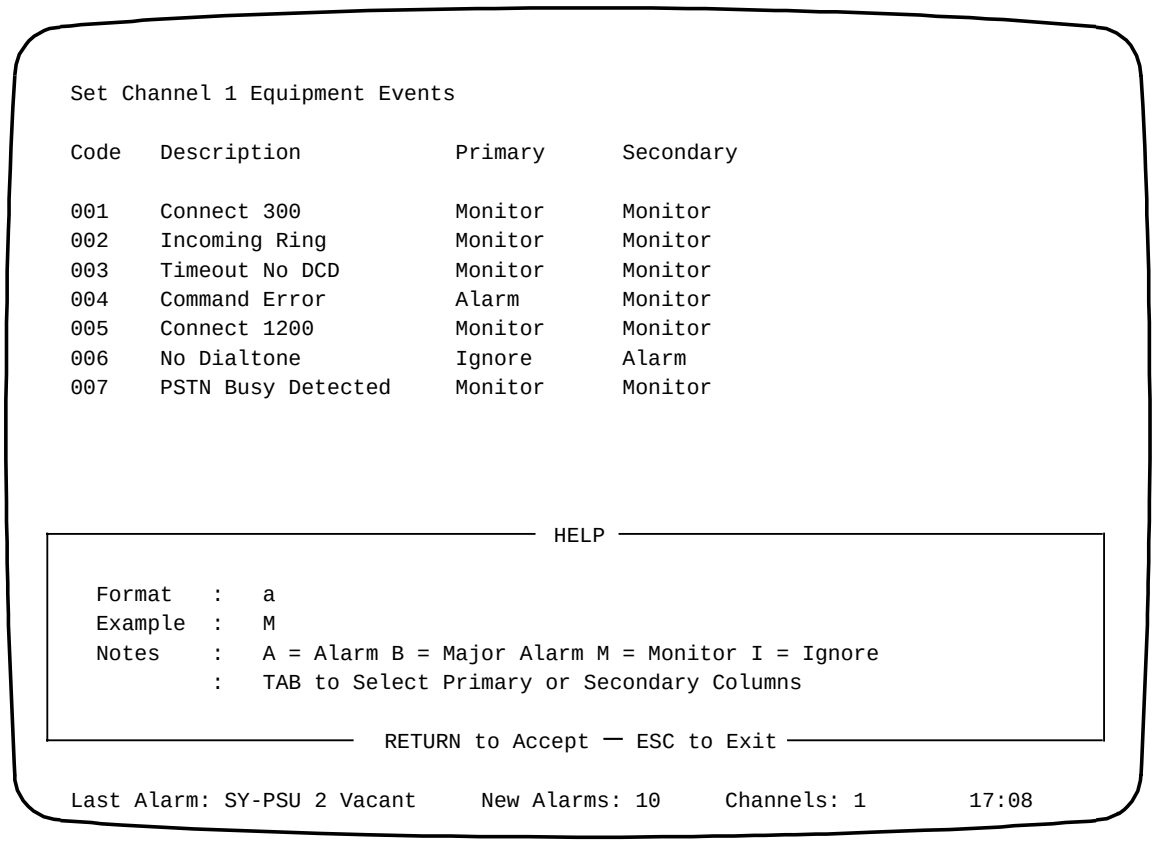
Each channel is treated individually and can be customised to suit the equipment it houses. You are prompted to enter the channel number whose event filters you wish to alter to obtain its menu:


Set Channel Event Filters – Channel 5.1
1 >Edit all Equipment Event Filters
2 Edit a Group of Equipment Event Filters
3 Reset Equipment Event Filters
4 Edit System Event Filters
5 Reset System Event Filters
6 Copy Primary Events to Secondary
Esc Exit
Please Enter Selection:
Last Alarm: 4-Equipment Failed
New Alarms: 18
Channels: 2
01:51

'Equipment Events' are those relating to the channel equipment, for example: 'Incoming Ring', 'Connect 1200', 'Number Blacklisted' or 'Bad Signal Quality'.

'System Events' are those that occur on the channel, but are originated by the Controller rather than the equipment within that channel.

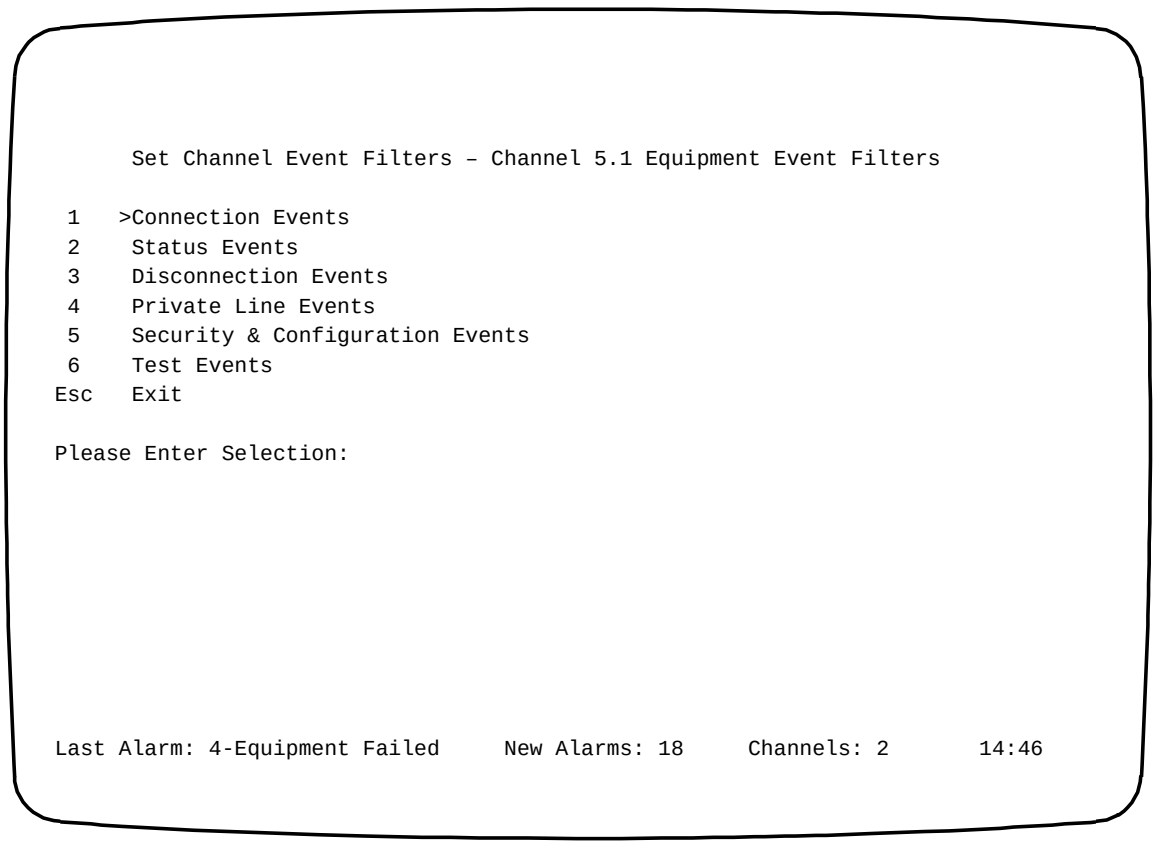
Item 1 Edit all Equipment Event Filters prompts you to select the first event code you wish to start with (001 to 200). The default is 1 so pressing Return will produce the input screen shown below for editing all equipment event filters. You can edit a particular event filter simply by entering its numeric code, or scroll through the list using the Return or Backspace key.


Set Channel 1 Equipment Events
Code Description Primary Secondary
001 Connect 300 Monitor Monitor
002 Incoming Ring Monitor Monitor
003 Timeout No DCD Monitor Monitor
004 Command Error Alarm Monitor
005 Connect 1200 Monitor Monitor
006 No Dialtone Ignore Alarm
007 PSTN Busy Detected Monitor Monitor
HELP
Format : a
Example : M
Notes : A = Alarm B = Major Alarm M = Monitor I = Ignore
: TAB to Select Primary or Secondary Columns
RETURN to Accept — ESC to Exit
Last Alarm: SY-PSU 2 Vacant New Alarms: 10 Channels: 1 17:08

'Primary' defines how the event will be treated when your channel equipment is in its normal operating mode.

'Secondary' defines how the event will be treated when your channel equipment is in dial backup operation.

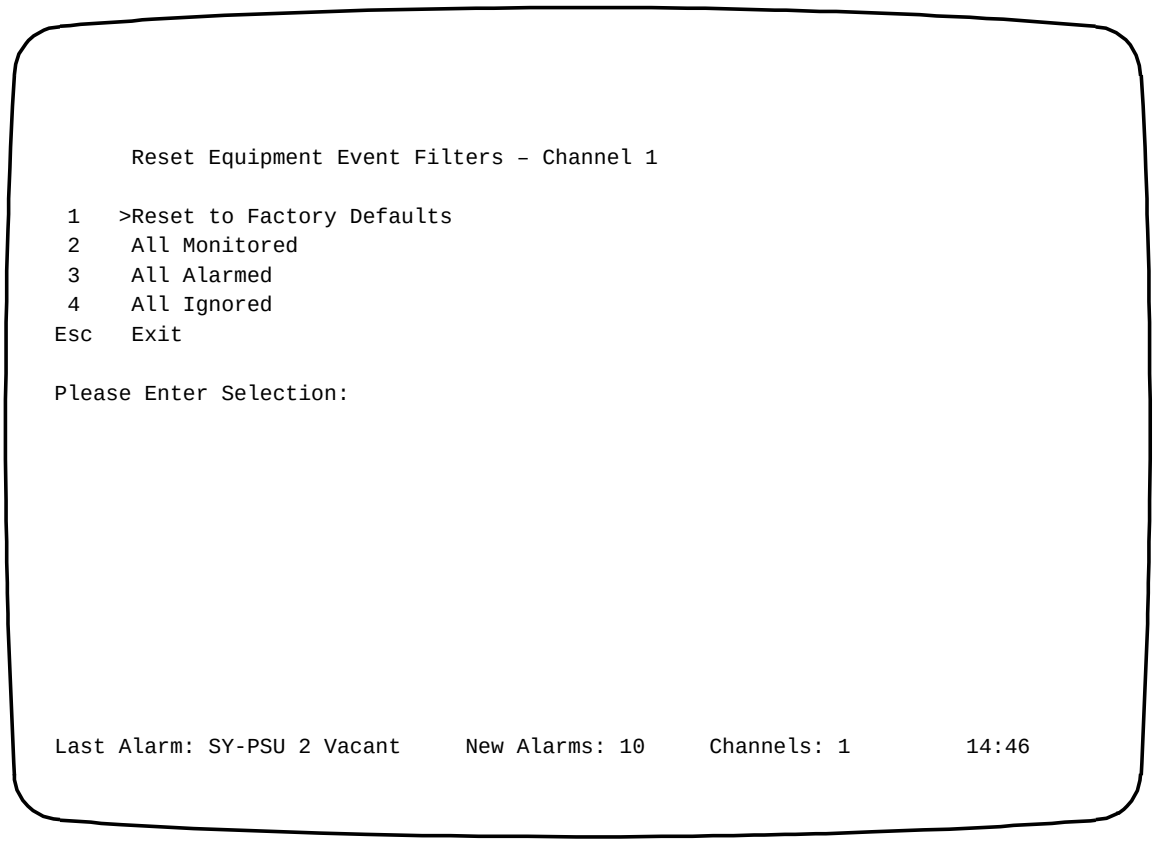
Item 2 Edit a Group of Equipment Event Filters produces a further sub-menu, designed to allow you to specify a grouping of equipment events to be edited:


Set Channel Event Filters – Channel 5.1 Equipment Event Filters
1 >Connection Events
2 Status Events
3 Disconnection Events
4 Private Line Events
5 Security & Configuration Events
6 Test Events
Esc Exit
Please Enter Selection:
Last Alarm: 4-Equipment Failed New Alarms: 18 Channels: 2 14:46

Selecting one of these group options produces the standard event filter editing screen. The heading is modified to reflect the specified group of events to be edited.

The Primary and Secondary 'Alarm' classification is then carried out as under item 1 above.

Item 3 Reset Equipment Event Filters produces a further sub-menu, designed to allow you to reset the event filters:



Selecting one of these options will reset all the grouped (equipment or system) event filters for the named channel as indicated.

Note that multi-channel equipment shares the same settings for event filters.

Item 4 Edit System Event Filters prompts you to select the first event code you wish to start with (001 to 200). You can edit a particular system event filter simply by entering its numeric code, or scroll through the list using the Return or Backspace key.

Item 5 Reset System Event Filters produces a further sub-menu (displaying the same options as Item 3) to allow you to reset the System Event Filters.

Item 6 Copy Primary Events to Secondary produces the prompt 'Please Confirm Copy (Yes or No)'.

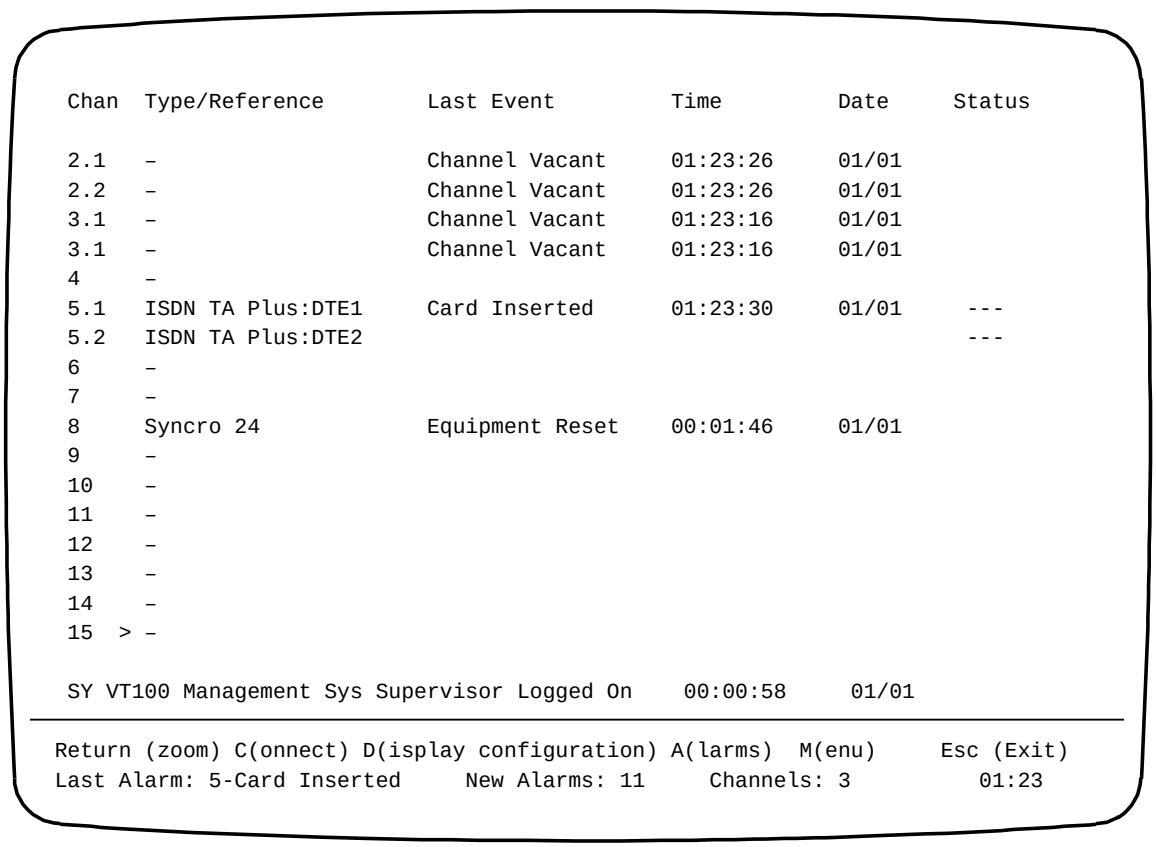
7 Monitoring Your System

Having logged on to the Controller, and configured the system and its equipment channels, you can now extensively monitor the performance of your whole system using items 1, 2, 3 of the Main Menu.

7.1 Display Channel Summary (Main Menu Option 1)

This menu displays the channels within your Controller. It lists all channels relating to the 16 equipment slots; the equipment type (or '–' if empty), or reference name in each, and the last event logged on that channel with the time and date that it occurred. A Status column also displays the equipment's current call status (if the equipment supports this feature).

An example of the Channel Summary screen is shown below. This screen is updated in real time as events occur.


Chan Type/Reference Last Event Time Date Status
2.1 – Channel Vacant 01:23:26 01/01
2.2 – Channel Vacant 01:23:26 01/01
3.1 – Channel Vacant 01:23:16 01/01
3.1 – Channel Vacant 01:23:16 01/01
4 –
5.1 ISDN TA Plus:DTE1 Card Inserted 01:23:30 01/01 ---
5.2 ISDN TA Plus:DTE2 ---
6 –
7 –
8 Syncro 24 Equipment Reset 00:01:46 01/01
9 –
10 –
11 –
12 –
13 –
14 –
15 > –
SY VT100 Management Sys Supervisor Logged On 00:00:58 01/01
Return (zoom) C(onnect) D(isplay configuration) A(larms) M(enu) Esc (Exit)
Last Alarm: 5-Card Inserted New Alarms: 11 Channels: 3 01:23

The Channel Summary screen provides an overview of the status of all the channels within your rack. At the foot of the screen are options to take you directly to the screens and menus that you are most likely to use. You can select a channel to examine by moving the cursor down or up and then keying the appropriate option key.

Return (zoom)	– displays the selected channel's status summary.
C(onnect)	– enables you to make a direct connection to the selected channel.
D(isplay configuration)	– displays the channel configuration and provides an edit option.
A(larms)	– displays the unseen alarms screen.
M(enu)	– displays a menu of often-used channel-related options.

Note that the Type/Reference column displays the channel reference name, if one has been set in the Configure Channel Parameters menu. Pressing **RETURN** will display the equipment type on the channel's Status Summary. If a reference name has not been set, the Channel Summary displays just the equipment type, together with a channel number if multi-channel equipment.

When multi-channel equipment, for example an ISDN TA Plus, is inserted into the rack an additional channel is allocated and the Channel Summary screen automatically 'opens up' to display the extra information (as shown in the screen above). Once there are more channels displayed than will fit on the screen, the screen will scroll as you move the cursor up or down allowing you to view all the channels.

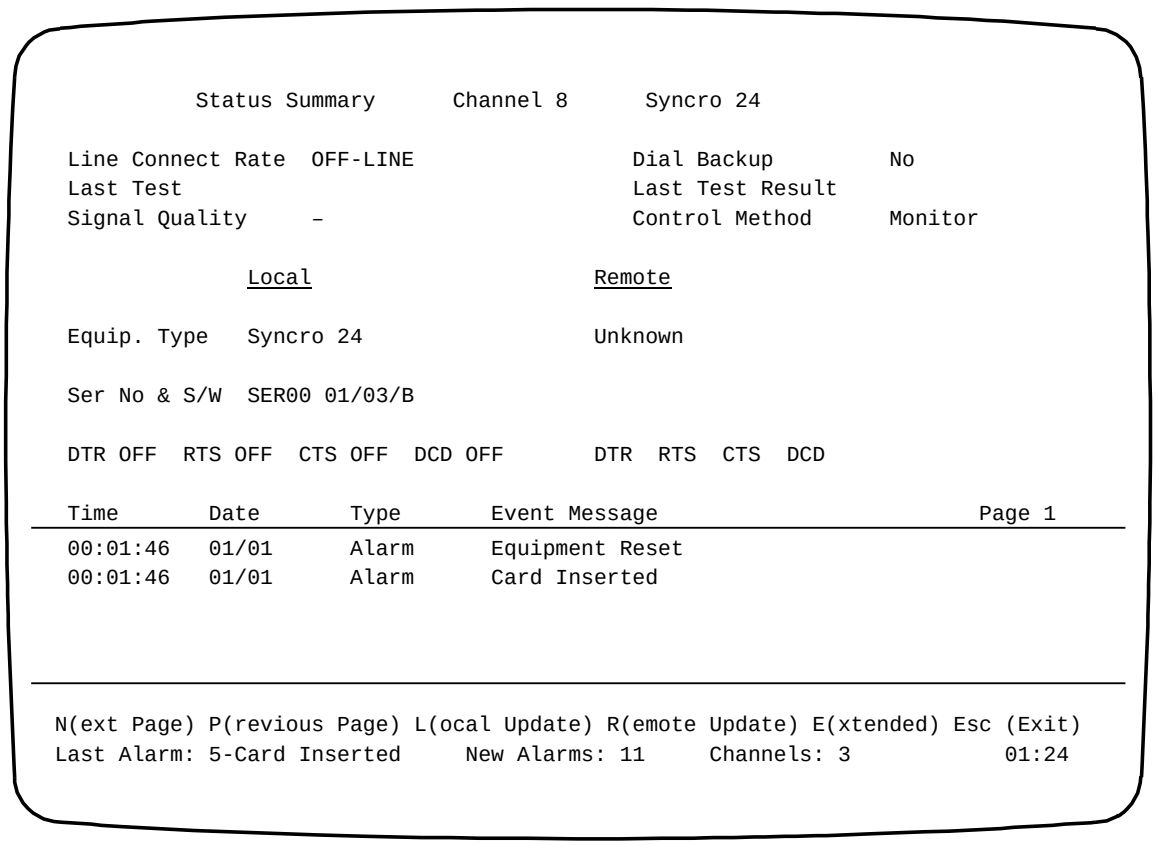
If you remove multi-channel equipment from the rack, the Channel Summary will still display two or more channels for that slot.

To reset an empty slot to display a single channel simply insert a single channel equipment into the slot. Alternatively, select Main Menu option 6 (Configure Channels) and then select option 8 (Set Empty Slots to Single Channel). (Refer to Section 5.8 for further information.)

7.2 Display Single Channel (Main Menu Option 2)

This menu enables you to select a single equipment channel (**S** for the system, **X** for the X.25, or **M** for SNMP management), and display its current status. Selecting a single channel will show you extensive detail of the equipment status on that channel.

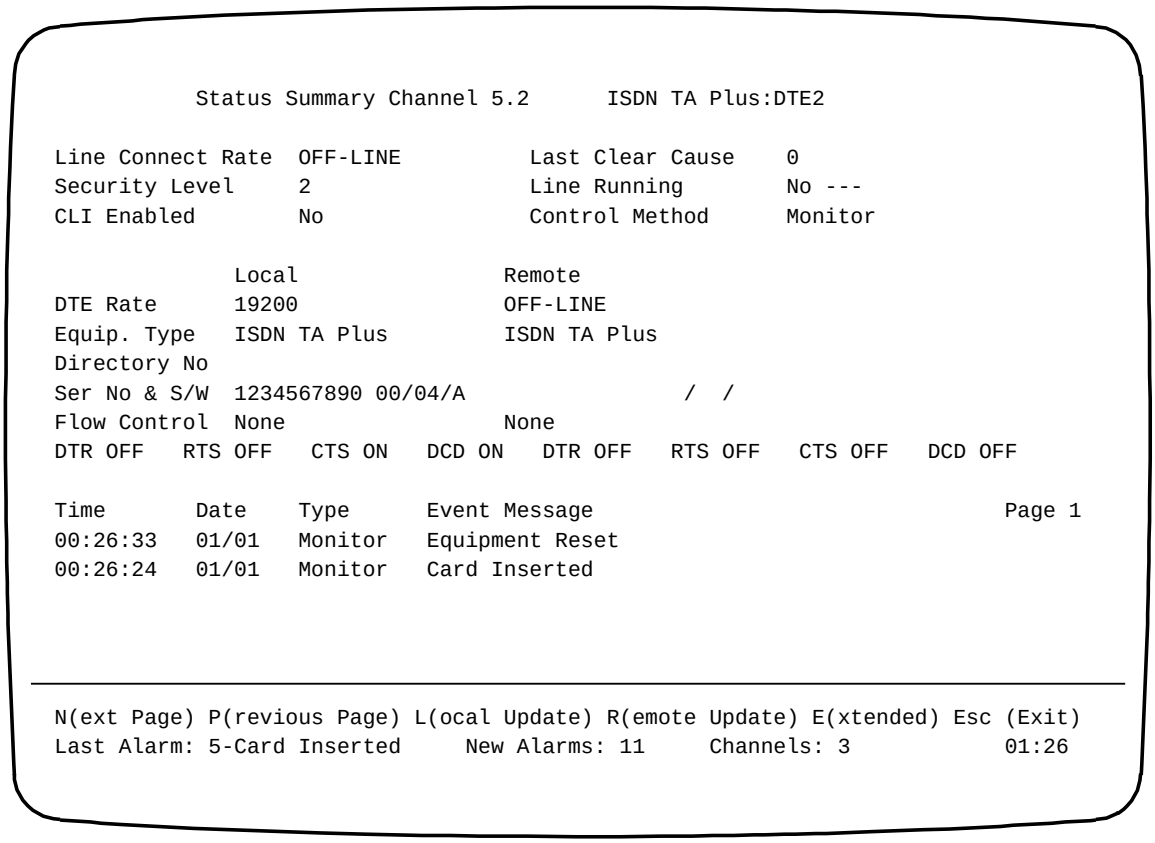
Alternatively, when viewing the Channel Summary you can scroll the cursor to the channel you want to examine in detail and simply press **RETURN** to call up that channel's Status Summary.


Status Summary Channel 8 Syncro 24
Line Connect Rate OFF-LINE
Dial Backup No
Last Test
Last Test Result
Signal Quality –
Control Method Monitor
Local
Remote
Equip. Type Syncro 24
Unknown
Ser No & S/W SER00 01/03/B
DTR OFF RTS OFF CTS OFF DCD OFF
DTR RTS CTS DCD
Time Date Type Event Message Page 1
00:01:46 01/01 Alarm Equipment Reset
00:01:46 01/01 Alarm Card Inserted
N(ext Page) P(revious Page) L(ocal Update) R(emote Update) E(xtended) Esc (Exit)
Last Alarm: 5-Card Inserted New Alarms: 11 Channels: 3 01:24

The display gives details of the local and remote equipment, their operating mode, and the last 20 events logged for that specific channel (whether alarms or monitored). Equipment serial numbers are discussed in Section 7.4.

The event log comprises four pages each showing five events. Scroll through the pages by keying **N** for next page, or **P** for previous page. Updated status of local or remote equipment is obtainable by keying **L** or **R**.

If the channel Status Summary is displayed for multi-channel equipment, such as a V.24 ISDN TA Plus, the summary fields change to those shown below.


Status Summary Channel 5.2 ISDN TA Plus:DTE2
Line Connect Rate OFF-LINE Last Clear Cause 0
Security Level 2 Line Running No ---
CLI Enabled No Control Method Monitor
Local Remote
DTE Rate 19200 OFF-LINE
Equip. Type ISDN TA Plus ISDN TA Plus
Directory No
Ser No & S/W 1234567890 00/04/A / /
Flow Control None None
DTR OFF RTS OFF CTS ON DCD ON DTR OFF RTS OFF CTS OFF DCD OFF
Time Date Type Event Message Page 1
00:26:33 01/01 Monitor Equipment Reset
00:26:24 01/01 Monitor Card Inserted
N(ext Page) P(revious Page) L(ocal Update) R(emote Update) E(xtended) Esc (Exit)
Last Alarm: 5-Card Inserted New Alarms: 11 Channels: 3 01:26

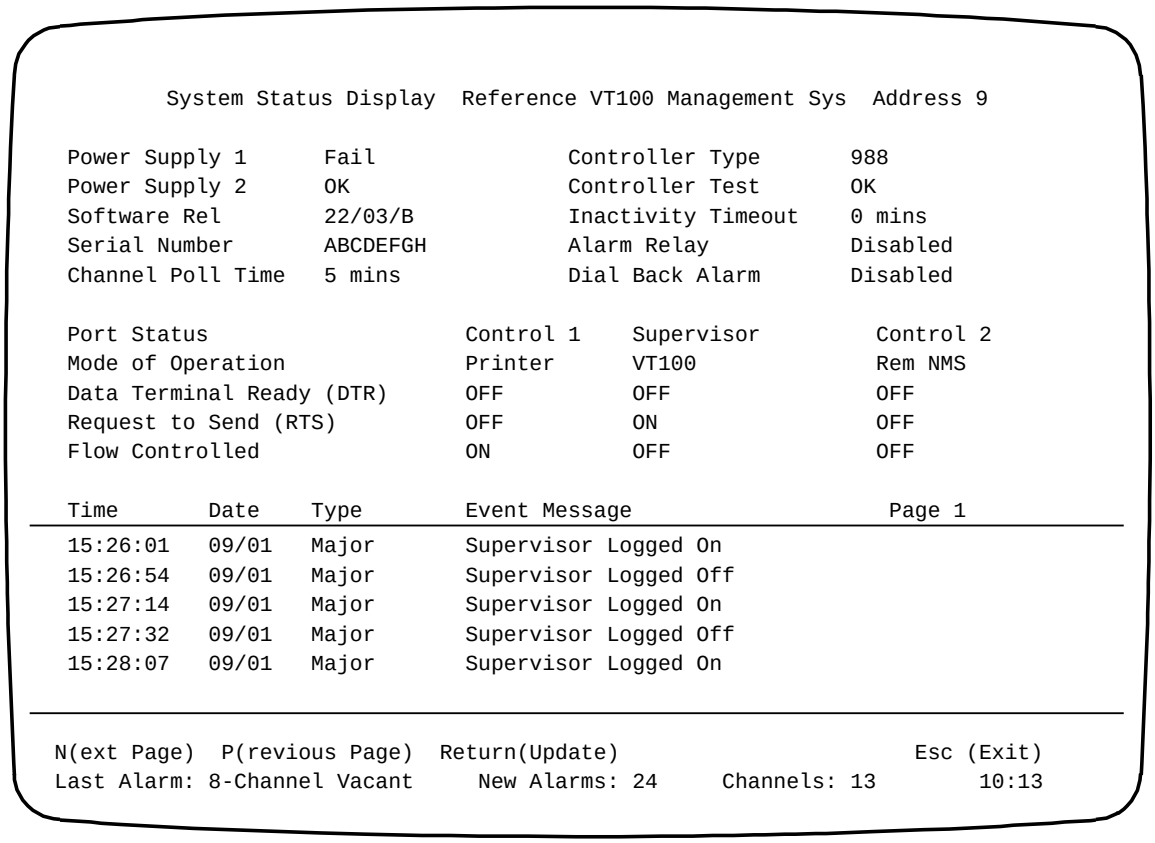
You will notice that the channel Status Summary is automatically updated every 30 seconds by the Controller executing an 'L' menu command, this ensures you always have up-to-date information to hand.

Extended status parameters of the equipment within a single channel can be viewed by keying **E** (these are not available on all equipment):

```
Channel 2    Modem :Syncro 1496    Reference Northwold Office 2
Parameter          Units   Local                                    Remote
Time Measured      hh:mm   02:57  02:56  02:55  02:54  02:53        02:57
RX Level           dBm       -17    -18    -18    -18    -18          -17
TX Level           dBm      ----   ----   ----   ----   ----         ----
Gain Hits          Count    ----   ----   ----   ----   ----         ----
Dropouts           Count    ----   ----   ----   ----   ----         ----
Impulse Hits       Count    ----   ----   ----   ----   ----         ----
Frequency Offset   Hz
Round Trip Delay   Secs     0:00   0:00   0:00   0:00  0 :00         0:00
Far End Echo       dBm       -83    -83    -83    -83    -83          -83
Phase Roll         Hz         +0     +0     +0     +0     +0           +0
EQM Value          None     0000   0000   0000   0000   0000         0000
Signal Quality     1-15        1      1      1      1      1            1
Signal to Noise    dBm        32     32     32     32     32           32
Estimated BER      exp        -7     -7     -7     -7     -7           -7
Phase Jitter       Deg      ----   ----   ----   ----   ----         ----
Phase Hits         Count    ----   ----   ----   ----   ----         ----
ARQ Errors         Count       0      0      0      0      0            0
Buffer Overflows   Count    ----   ----   ----   ----   ----         ----
Compression Ratio  Ratio    ----   ----   ----   ----   ----         ----

N(ext Page) P(revious Page) L(ocal Update) R(emote Update) E(xtended) Esc (Exit)
Last Alarm: Ch8 Channel Vacant     New Alarms: 24     Channels: 13        10:13
```

The System display option gives equipment, software and operating mode information, port status for the control ports, as well as the last 20 system events logged (four pages each showing five events):


System Status Display Reference VT100 Management Sys Address 9
Power Supply 1 Fail
Power Supply 2 OK
Software Rel 22/03/B
Serial Number ABCDEFGH
Channel Poll Time 5 mins
Controller Type 988
Controller Test OK
Inactivity Timeout 0 mins
Alarm Relay Disabled
Dial Back Alarm Disabled
Port Status Control 1 Supervisor Control 2
Mode of Operation Printer VT100 Rem NMS
Data Terminal Ready (DTR) OFF OFF OFF
Request to Send (RTS) OFF ON OFF
Flow Controlled ON OFF OFF
Time Date Type Event Message Page 1
15:26:01 09/01 Major Supervisor Logged On
15:26:54 09/01 Major Supervisor Logged Off
15:27:14 09/01 Major Supervisor Logged On
15:27:32 09/01 Major Supervisor Logged Off
15:28:07 09/01 Major Supervisor Logged On
N(ext Page) P(revious Page) Return(Update) Esc (Exit)
Last Alarm: 8-Channel Vacant New Alarms: 24 Channels: 13 10:13

7.3 View Event Log Files (Main Menu Option 3)

Events which you have classified as 'Alarm', 'Major Alarm' or 'Monitored Events' can be viewed using item 3 of the Main Menu. You can call up individual screens for Unacknowledged Alarms, Alarm Events or Monitored Events.

Unacknowledged Alarms are shown chronologically. Pressing **A** will reclassify them as Acknowledged (except under 'User' password). You can also update the display by pressing **RETURN**.

You can view Alarm or Monitored Events for an individual channel by keying the channel number required, for the system by keying **S**, or all together by keying **A**. Each of these categories can then be called up oldest first, or latest first.

7.4 Configuring Modem Serial Numbers

Network managers may create their own equipment serial number database by programming their own serial number into the equipment. To set the serial number, first connect to the channel (option 4 of the Main Menu, or key C whilst in the overview screen).

The serial number is displayed by typing the command **AT I 6**. This will then display a 5-character string SER00, followed by a 5-character string if the serial number has been set.

To set the serial number:

Enter: **AT I 9 <CR>**

Response: ERROR

Enter: **AT*Q9 ABCDE<CR>** where ABCDE is the desired serial number. (The AT*Q9 command must immediately follow the ERROR response which is a security feature for the serial number, to inhibit the casual user from changing serial numbers.)

Response: OK

Check that the serial number has been stored by:

Enter: **AT I 6**

Response: SER00ABCDE

This value will survive power cycles and restarts.

8 Controlling Your System

8.1 Connect to Channel (Main Menu Option 4)

If you want to issue commands direct to a channel on any of your slot equipment, you can connect the Controller's VT100 terminal to the Command port of the equipment within a slot by means of Main Menu item 4.

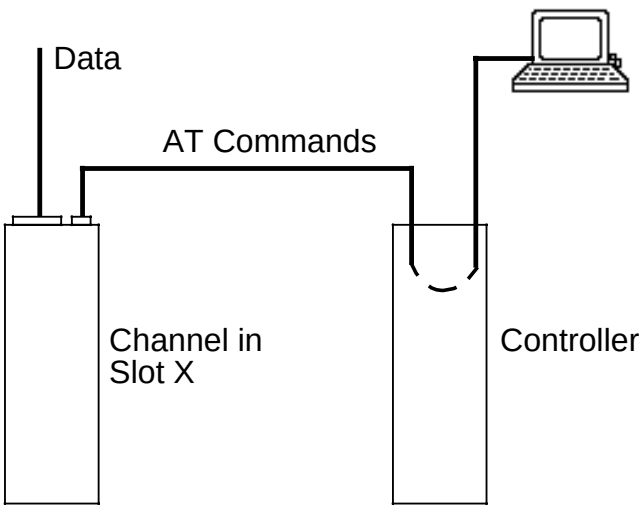


Figure 8-1 Connection to a Channel

Pressing **ESC** will release the channel connection, and your terminal will again be commanding the Controller.

Note: Any events on the channel will appear on the terminal, but will not be recorded by the Controller. While connected directly to a channel, the Controller will not monitor channel events.

This is the same as pressing 'C' whilst in the Overview screen (Display Channel Summary).

8.2 Remote Systems (Main Menu Option 5)

There are two methods you can use to connect to a remote system. Both methods are accessed via option 5 of the Main Menu these are:

– **Transparent Connection.** Controllers can be connected together so that a local control port may be used to transparently connect to a remote system or another piece of asynchronous equipment. This method requires the port to be defined as 'user'. Refer to Section 8.2.1 for details on making a transparent connection.

– **Direct Connection.** A number of controllers can be connected together in a network configuration which allows direct connection to any controller in the network. To make a direct connection to a selected remote system via a local controller port requires the port to be defined as 'NMS'. Refer to Chapter 11 for details on Network Management and Section 11.3.2 for details on direct connection to a remote system (NMS mode). This method also allows events to be passed between Controllers, even whilst a direct connection is in progress.

Both types of connections appear as if the terminal were unplugged from the local controller and plugged into the remote – the local controller behaves as a transparent window onto the remote controller.

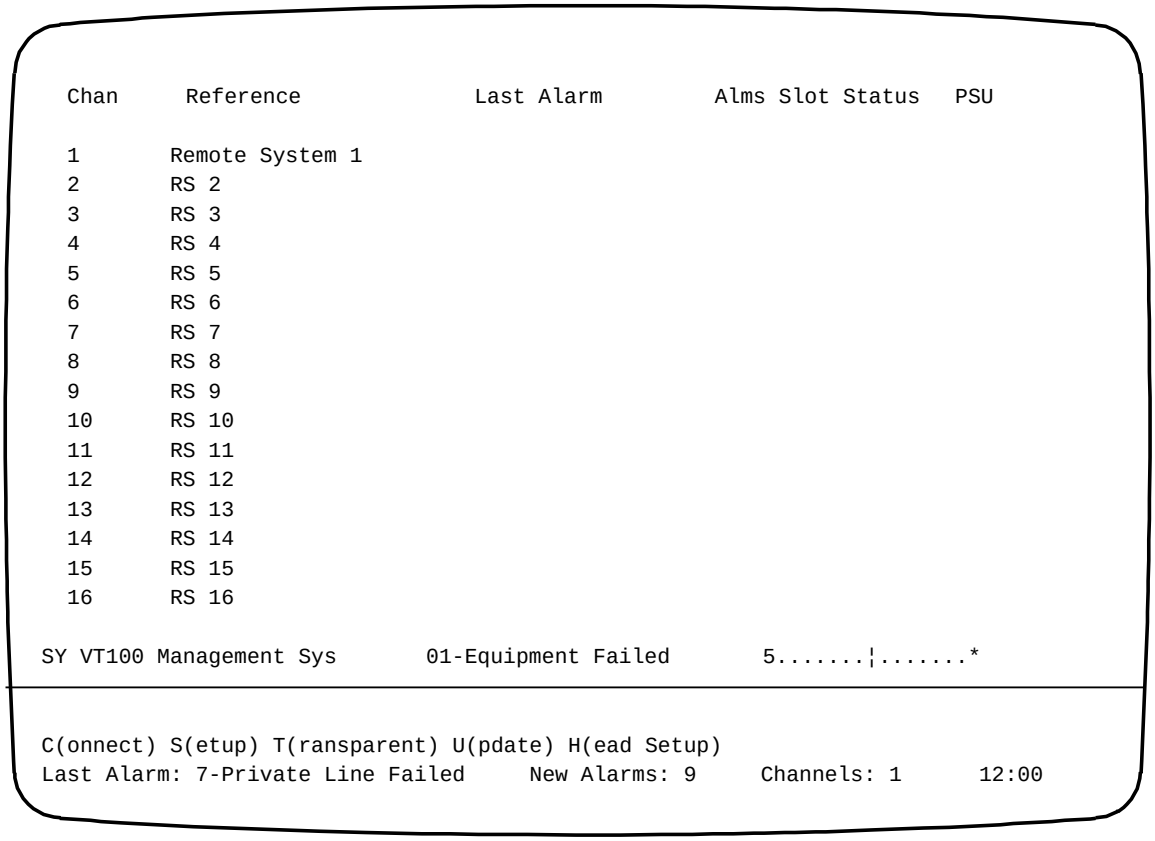
8.2.1 Transparent Connection

To transparently connect to remote systems:

– See Appendix C for details of the cable used to connect racks or single equipment in series, and details of the required control signal conditions.

– The port mode of operation has to be set to 'User' with the appropriate speed etc. (Item 2 of Configure Port Parameter in Main Menu option 7).

Select option 5 from the Main Menu to display the Remote Systems menu:


Chan Reference Last Alarm Alms Slot Status PSU
1 Remote System 1
2 RS 2
3 RS 3
4 RS 4
5 RS 5
6 RS 6
7 RS 7
8 RS 8
9 RS 9
10 RS 10
11 RS 11
12 RS 12
13 RS 13
14 RS 14
15 RS 15
16 RS 16
SY VT100 Management Sys 01-Equipment Failed 5.......¦.......*
C(onnect) S(etup) T(ransparent) U(pdate) H(ead Setup)
Last Alarm: 7-Private Line Failed New Alarms: 9 Channels: 1 12:00

Enter **T** (for Transparent) to request a direct connection to a control port in User mode.

– If none of your control ports are in User mode, your Controller will display the message There are no Control Ports in User Mode.

– If only one of the ports has been configured as User, a direct connection is made to that port.

– If more than one port has been configured as User, a sub-menu appears listing the available ports.

Having chosen the port to which your remote system is connected, or having made a connection through the only available port, log on to the remote system using two carriage returns.

The remote system's Main Menu appears, and commands keyed in at the terminal will merely pass through the local Controller to the remote system for execution.

While connected to a remote system, all the information displayed on the screen, including the status line, is from the remote system to which you are connected.

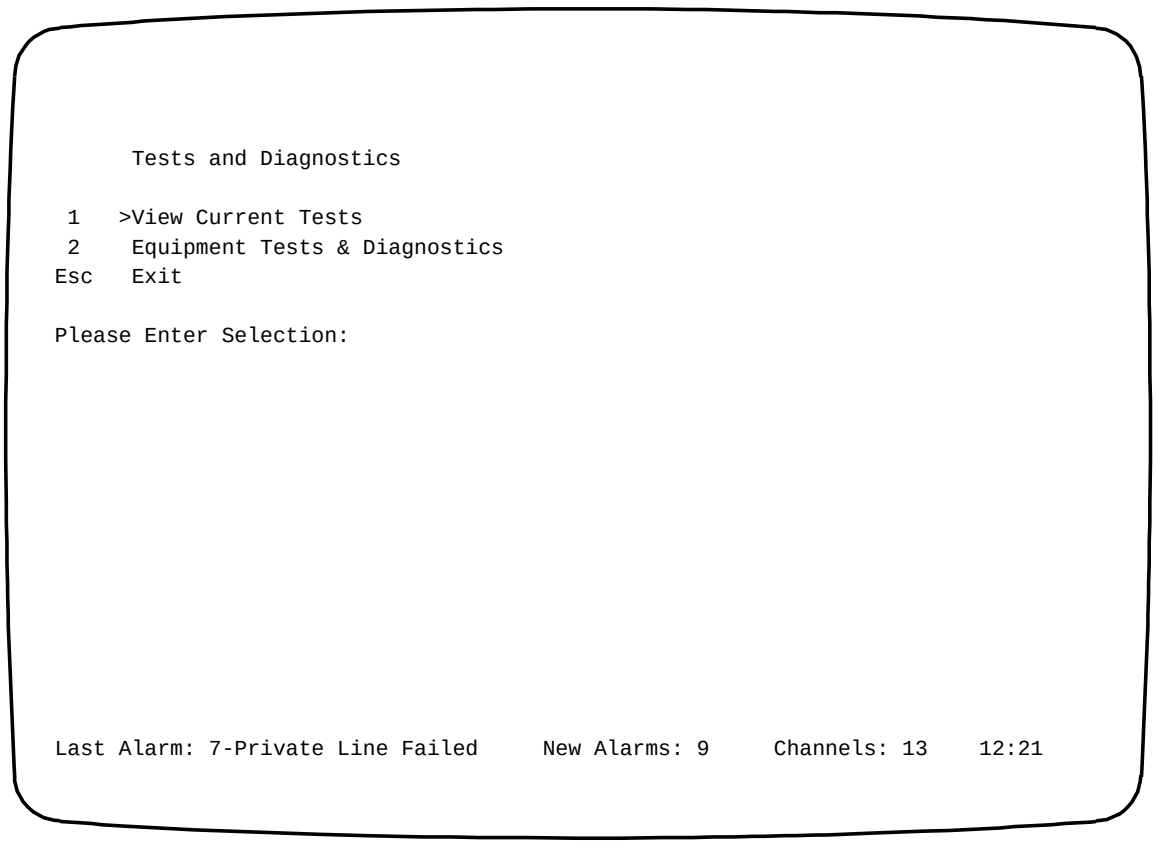
A number of systems can be linked in this way, and the transit sequence should be repeated for successive connection to the next system in line. The terminal only ever commands the latest system in the sequence.

Press **Control C** to break the remote system connection(s), and re-establish control of the local system.

9 Test and Diagnostic Capabilities

9.1 Tests and Diagnostics Menu (Main Menu Option 8)

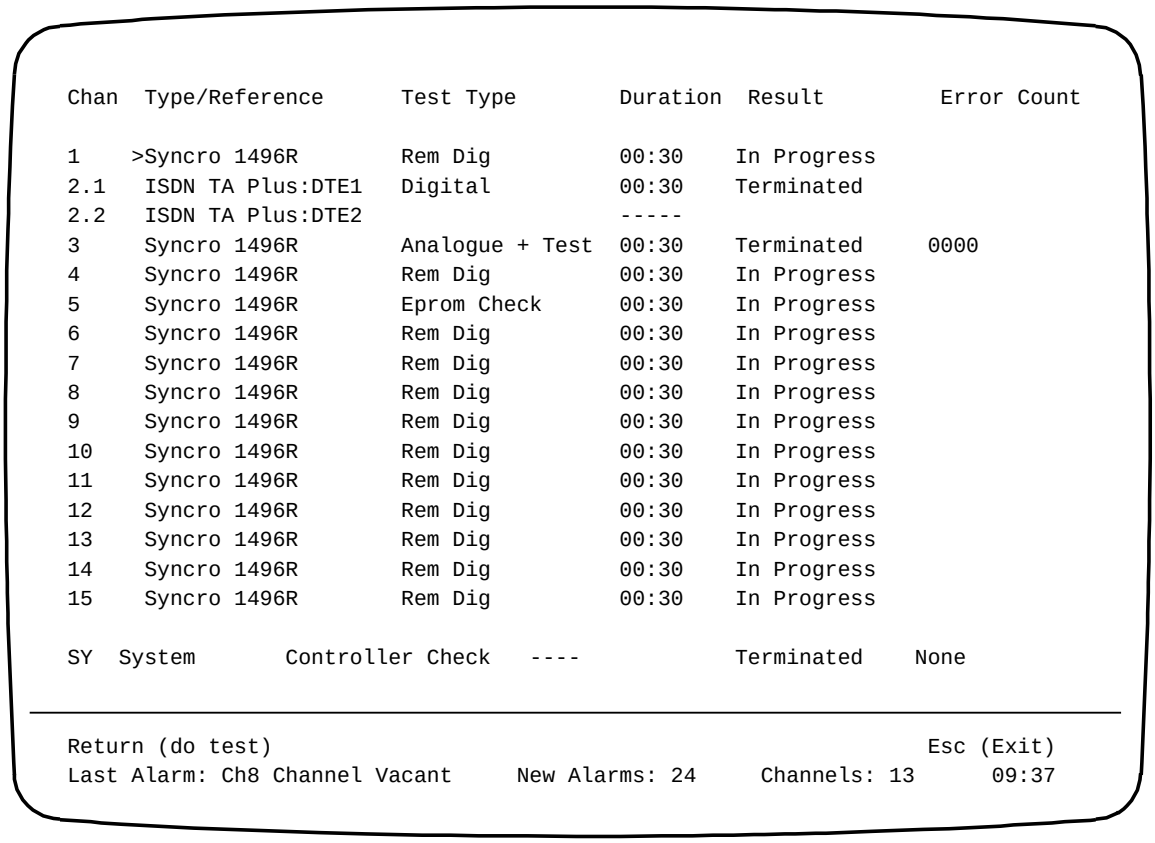
Equipment tests can be performed from option 8 of the Main Menu:



9.2 View Current Tests (Test & Diagnostics Menu Option 1)

This menu will give you a display of the latest test performed on equipment within each channel and on the system, detailing the test duration, result and error count.

An example of this screen is shown below.



```
Chan  Type/Reference      Test Type        Duration  Result         Error Count

1    >Syncro 1496R        Rem Dig          00:30    In Progress
2.1   ISDN TA Plus:DTE1   Digital          00:30    Terminated
2.2   ISDN TA Plus:DTE2                    -----
3     Syncro 1496R        Analogue + Test  00:30    Terminated     0000
4     Syncro 1496R        Rem Dig          00:30    In Progress
5     Syncro 1496R        Eprom Check      00:30    In Progress
6     Syncro 1496R        Rem Dig          00:30    In Progress
7     Syncro 1496R        Rem Dig          00:30    In Progress
8     Syncro 1496R        Rem Dig          00:30    In Progress
9     Syncro 1496R        Rem Dig          00:30    In Progress
10    Syncro 1496R        Rem Dig          00:30    In Progress
11    Syncro 1496R        Rem Dig          00:30    In Progress
12    Syncro 1496R        Rem Dig          00:30    In Progress
13    Syncro 1496R        Rem Dig          00:30    In Progress
14    Syncro 1496R        Rem Dig          00:30    In Progress
15    Syncro 1496R        Rem Dig          00:30    In Progress

SY  System       Controller Check   ----            Terminated    None

Return (do test)                                                Esc (Exit)
Last Alarm: Ch8 Channel Vacant     New Alarms: 24     Channels: 13      09:37
```

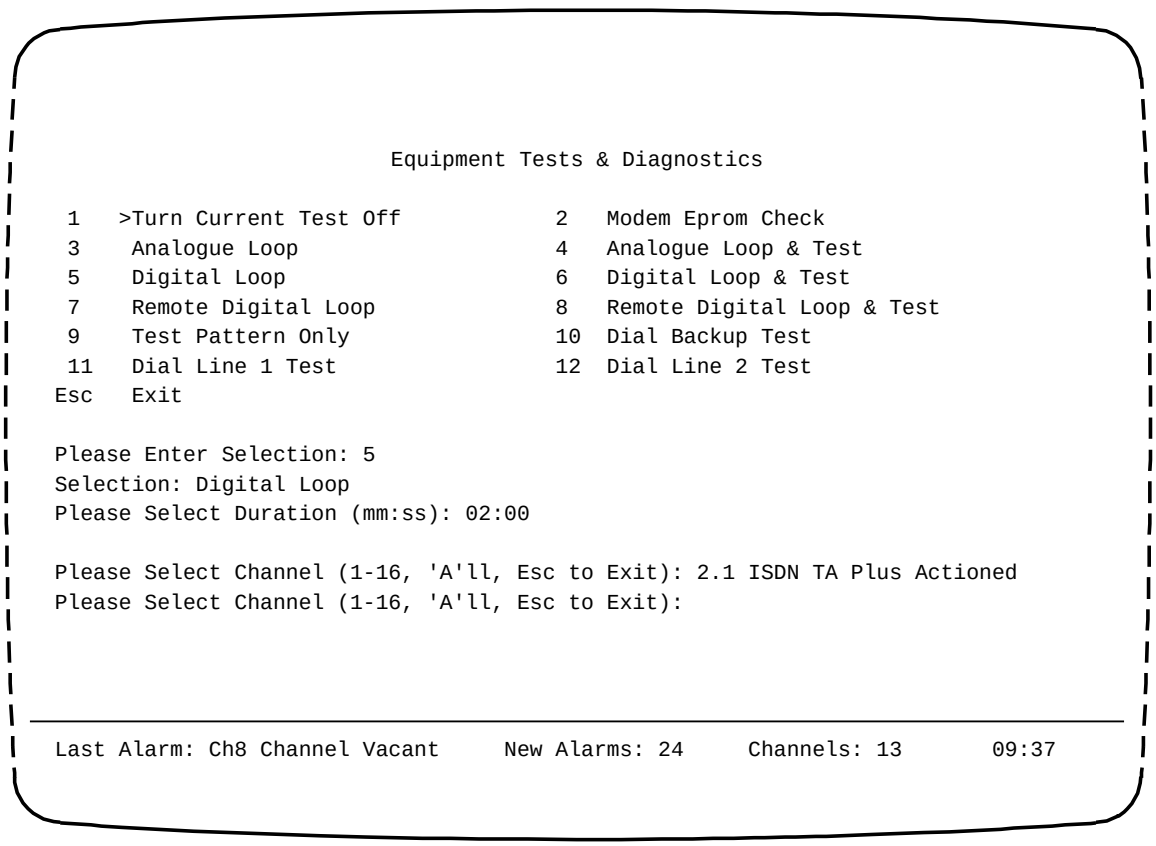
When multi-channel equipment is installed the screen 'opens up' to display the additional channels, resulting in too many channels to display on one screen – you have to scroll the cursor up or down to display the channels hidden from view.

You can press **RETURN** to take you straight to the Equipment Tests & Diagnostics menu.

9.3 Equipment Tests & Diagnostics (Test & Diagnostics Menu Option 2)

This menu will give you a list of twelve equipment tests you can perform.

You can also select this menu by pressing **RETURN** whilst in the View Current Tests screen.

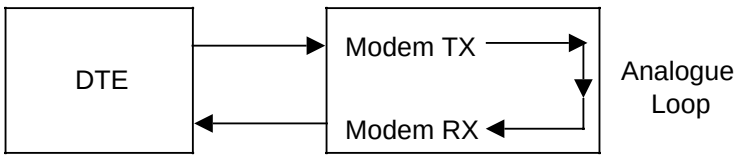

Equipment Tests & Diagnostics
1 >Turn Current Test Off
2 Modem Eprom Check
3 Analogue Loop
4 Analogue Loop & Test
5 Digital Loop
6 Digital Loop & Test
7 Remote Digital Loop
8 Remote Digital Loop & Test
9 Test Pattern Only
10 Dial Backup Test
11 Dial Line 1 Test
12 Dial Line 2 Test
Esc Exit
Please Enter Selection: 5
Selection: Digital Loop
Please Select Duration (mm:ss): 02:00
Please Select Channel (1-16, 'A'll, Esc to Exit): 2.1 ISDN TA Plus Actioned
Please Select Channel (1-16, 'A'll, Esc to Exit):
Last Alarm: Ch8 Channel Vacant
New Alarms: 24
Channels: 13
09:37

If you select a test numbered 3, 4, 5, 6, 7 or 8, you will be prompted to key in the desired duration of the test.

Select the channel equipment you wish to test and your Controller will return Test Activated.

If the equipment in the channel you have selected does not support that test your Controller will return Test Not Supported.

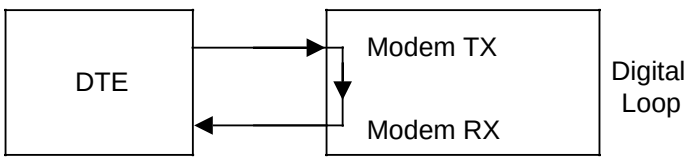
Analogue Loop Test V.54 loop 3



An analogue loop test can be performed in two ways:

- Using the modem's built-in test pattern generator which will transmit a known message internally through the modem and compare the message received with the message sent. It will then report any error and display an error count at the end of the test.
- Using an external test source to generate the test pattern, which will be passed through the modem and compared with the message sent. The test equipment will then report any error and display an error count at the end of the test.

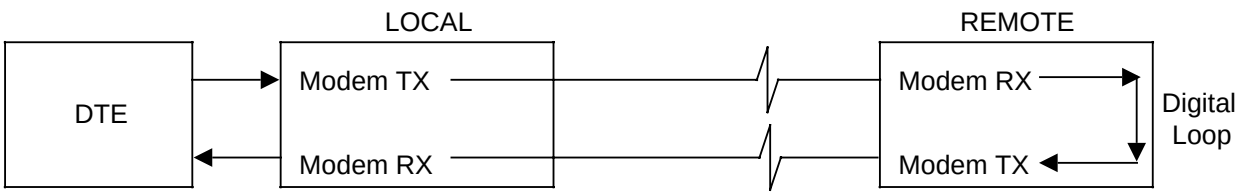
Digital Loopback Test V.54 loop 1



A digital loop is used to test the link between the modem and the DTE.

Using either an external or internal test source, a message is passed from the DTE to the modem and directly back to the DTE. It will then report any error and display an error count at the end of the test.

Remote Digital Loopback Test V.54 loop 2



A remote digital loop is used to test the link between the two modems as well as the modems themselves.

Using either an external test source or the local modem's own test pattern, a message is passed through the local modem down the connecting line, through the remote modem, and back down the line to the local modem. The message received is compared with the message sent. It will then report any error and display an error count at the end of the test.

Modem Eprom Check

The modem performs a check on its Eprom and compares it to a known value. The internal Eprom checksum is displayed in hex format.

Dial Line Test

The Controller checks that the channel equipment is correctly connected to the line (by looking for dial tone).

9.4 Power-on Tests

When powering ON your Controller, it immediately runs diagnostic tests on:

Software
Memory
Interface Ports
Channels
Real Time Clock
System Components

The **TST** LED will be lit as long as the tests are in progress. The LED flashing sequence will stop at any failed test. At the conclusion of an all-correct test, just the **RUN** LED will stay alight.

Below is a listing of the test results for the Network 16 Controller Module only, along with the corresponding LED pattern.

Test Result	**Network 16 LED Pattern**				
	1	**2**	**3**	**4**	**5**
Bank Switching Error	Off	Off	Off	Off	ON
EPROM 1 Checksum/Data Error	Off	Off	Off	ON	Off
EPROM 2 Checksum/Data Error	Off	Off	Off	ON	ON
RAM 1 Memory Fault	Off	Off	ON	Off	Off
RAM 2 Memory Fault	Off	Off	ON	Off	ON
RAM 3 Memory Fault	Off	Off	ON	ON	Off
RAM 4 Memory Fault	Off	Off	ON	ON	ON
SIO 0 (Port 1+2) Error	Off	ON	Off	Off	Off
SIO 1 (Port 3) Error	Off	ON	Off	Off	ON
SIO 2 (Channel 1+2) Error	Off	ON	Off	ON	Off
SIO 3 (Channel 3+4) Error	Off	ON	Off	ON	ON
SIO 4 (Channel 5+6) Error	Off	ON	ON	Off	Off
SIO 5 (Channel 7+8) Error	Off	ON	ON	Off	ON
SIO 6 (Channel 9+10) Error	Off	ON	ON	ON	Off
SIO 7 (Channel 11+12) Error	Off	ON	ON	ON	ON
SIO 8 (Channel 13+14) Error	ON	Off	Off	Off	Off
SIO 9 (Channel 15+16) Error	ON	Off	Off	Off	ON
CTC 0 Error	ON	Off	Off	ON	Off
CTC 1 Error	ON	Off	Off	ON	ON
Real Time Clock Error	ON	Off	ON	Off	Off

Below is a listing of the test results for the Network 6 only, along with the corresponding LED pattern.

Test Result	**Network 6 LED Pattern**				
	DB	**ME**	**AE**	**CRX**	**CTX**
Bank Switching Error	Off	Off	Off	Off	ON
EPROM 1 Checksum/Data Error	Off	Off	Off	ON	Off
EPROM 2 Checksum/Data Error	Off	Off	Off	ON	ON
RAM 1 Memory Fault	Off	Off	ON	Off	Off
RAM 2 Memory Fault	Off	Off	ON	Off	ON
RAM 3 Memory Fault	Off	Off	ON	ON	Off
RAM 4 Memory Fault	Off	Off	ON	ON	ON
SIO 0 (Port 1+2) Error	Off	ON	Off	Off	Off
SIO 1 (Port 3) Error	Off	ON	Off	Off	ON
SIO 2 (Channel 1+2) Error	Off	ON	Off	ON	Off
SIO 3 (Channel 3+4) Error	Off	ON	Off	ON	ON
SIO 4 (Channel 5+6) Error	Off	ON	ON	Off	Off
SIO 5 (Channel 7+8) Error	Off	ON	ON	Off	ON
CTC 0 Error	ON	Off	Off	ON	Off
Real Time Clock Error	ON	Off	ON	Off	Off

10 Multi-drop Modem Links

10.1 Support of Multi-drop Links

Your Controller will support multi-drop applications of individual equipment within a slot. The maximum number of remote drops available is 15, each drop site being allocated a unique address 1 to 15 (set in its S-register 24).

Not all equipment models can support multi-drop applications; some equipment that can support multi-drop cannot support multi-drop diagnostics. Your Controller interrogates its equipment identity table each time a multi-drop function is requested, and if the channel equipment cannot support multi-drop diagnostics the Controller will return an error message.

For a detailed description of a multi-drop link and the functions that are available, refer to your modem manual.

10.2 Defining the Number of Multi-drop Sites

Item 5 of the Configure Channel Parameters menu is used to determine the number of remote drops that are available on a specific channel.

This item should be set to 0 on a point-to-point or remote multi-drop modem. For a 'hub multi-drop' (central site) modem, this item should be set to reflect the number of remote multi-drop modems available. For example if your network consists of a central site and ten multi-drop modem sites, item 5 on the Configure Channel Parameters menu of the central site modem should be set to 10; each of the ten remote modems should have this item set to 0.

10.3 Multi-drop Configuration Upload/Download

Options 3 and 4 of the Configure Channels menu enable you to download channel configurations from the Controller, or upload channel configurations to the Controller, for the local and remote ends, as well as from or to a specific modem within a multi-drop link.

If a channel has been defined as holding a multi-drop modem (see Section 10.2), and you request a remote upload or download, the Controller will first check that the equipment in the slot does actually support multi-drop applications (using the equipment identity table), before prompting you for the number of the multi-drop modem to or from where you wish to upload/download.

It is only possible to upload/download to one drop site at a time. An attempt to action a multi-drop configuration upload or download for a modem that is not configured to support multi-drop or does not support the number of multi-drops requested, will produce a Not Supported response.

10.4 Multi-drop Channel Status Upload

Option 2 of the Main Menu enables you to select a single equipment channel and display the current status of the local or remote end.

If the selected channel is defined as holding a multi-drop modem, and the modem in the slot supports multi-drop upload/download, and the status screen of the remote end is selected, you will be prompted for the number of the multi-drop modem from which to upload the status screen.

It is only possible to display the current status settings of a single modem within the multi-drop link at any one time.

10.5 Performing an RDL on a Multi-drop Site

If the selected channel is defined as holding a multi-drop modem, and the modem in the slot supports multi-drop RDL, you will be prompted to specify the number of the multi-drop modem to test.

An attempt to action a multi-drop RDL for a modem that is not configured to support multi-drop, or does not support the number of multi-drops requested, will result in a Not Supported status being returned.

10.6 Reverting to Point-to-Point Applications

If the mode of operation of any channel equipment is changed from multi-drop to point-to-point, the channel must be reconfigured with the number of multi-drop links set to 0 (see Section 10.2). If this is not done, any upload/download or RDL requests will fail, since the wrong V.54 pattern will be sent to the remote modem.

11 Network Management

11.1 Introduction

Whichever method of network management you are planning to use, you will need to interconnect your controllers and give each one a unique address before proceeding. It is necessary for *all* users to read Section 11.2 Initial Setup, before moving on to the appropriate network management section.

The following methods of network management are supported:

- Head Controller (see Section 11.3)

  Any Controller acts as a management station for the others, defined within a domain, through a VT100 terminal.

- MAP/MLP

  This is the Controller's native protocol which also supports SNMP.

- SNMP (see Section 11.4)

  Supported over serial line (using SLIP), or over X.25 (using RFC 877 or SLIP). SNMP is the protocol recognised by Cray Communications DomainView.

11.2 Initial Setup

11.2.1 Controller Interconnection

Controllers may be interconnected by using their control ports.

When creating a network of Controllers best results are obtained when using a tree structure like that shown in Figure 1-1. This ensures that the number of hops between the head Controller and each remote Controller is kept to a minimum (the speed of response is directly affected by the number of hops to a remote site). Note: the maximum number of hops within a network is defined in the Configure Remote System Parameters submenu (see Section 11.3.2).

To interconnect Controllers:

– See Appendix C (Section C.2.2) for details of the daisy-chain cable and additional setup information that you will need.

– The port mode of operation must be set as shown in the screen below. (This is accessed via Main Menu option 7, Configure Port Parameters item 2. See Section 4.3 for more details.) Note that the settings are made automatically when NMS or Remote NMS modes are selected.

```
     Configure Port Parameters

  1  >Port Number                :    Supervisor
  2   Port Mode of Operation     :    Network Management
  3   Port Speed bit/s           :    9600
  4   Number of Data Bits        :    8
  5   Parity                     :    None
  6   No of Stop Bits            :    1
  7   Xon/Xoff Flow Control      :    Disabled
  8   RTS Flow Control           :    Disabled
  9   DCD Control                :    High
  10  DSR Control                :    High
  11  RI Control                 :    Low
  12  CTS Control                :    High

   –  End of List (ESC to Exit)  :
                                   HELP
  Format   :   a
  Example  :   H
  Notes    :   H = High            L = Low
           :
            RETURN to Accept — ESC to Exit — BACKSPACE to step up
Last Alarm: SY-PSU 2 Vacant     New Alarms: 10     Channels: 1         15:40
```

It is important to note that:

– the NMS protocol should be set to MLP (accessed via Main Menu option 7, option 1, item 18).

– the control ports at *both* ends of the daisy-chain cable must be set up as described above, and each Controller *must* have a unique address.

11.2.2 Address Selection

Each Controller needs a unique address. This is used by the protocol frame to indicate which Controller should action it. On receiving a protocol frame on one of its ports, the Controller will examine the destination address:

– If this matches its address or is the global address it will action the frame accordingly.

– If this does not match, or is the global address, it will retransmit the frame on each port that is designated NMS.

The address is set on hardware using DIP switches on the PCB (Appendix G shows the location of the DIP switches. There are 12 switches, which will allow a maximum of 4096 different addresses to be set. The least significant bit is towards the front panel of your Controller (Switchbank 1, switch 1); the most significant is towards the rear (Switchbank 2, switch 4).

The addresses can be set in one of two ways, depending on the protocol selected in Configure Systems Parameters item 18 (see Section 4.2):

If MLP protocol has been selected:

The protocol address is applied directly to the switches – giving a range of addresses 0 to FFF Hex (4095). An attempt to select the global address (0) will result in address FFF Hex (4095) being selected.

When running MLP on an NMS, the control ports must be set to operate at 8 data, no parity with 1 stop bit, XON/XOFF must be disabled, RTS must be disabled.

If OSMUX protocol has been selected:

(i) Convert the desired protocol address into OCTAL format, using the table below:

Protocol Character	Octal Address
0	0
3	1
5	2
6	3
9	4
A	5
C	6
F	7

(ii) The resultant Octal address needs to be converted into hexadecimal format, and then set on the DIP switches.

Example: F950 becomes Octal 7420 which becomes Hex F10.

An attempt to select the global address (0), will result in address FFF being selected.

Note that new switch settings only take effect when the port goes into network management mode - this happens automatically at power-up.

11.2.3 Event Handling (UQPR and SNMP Traps)

A UQPR is an unsolicited message broadcast by the Controller to an NMS, to indicate that an event has occurred. (If you are an SNMP user the UQPR provides the message in the form of an SNMP Trap.)

Your Controller is equipped with the ability to generate Uninitiated Quick Poll Responses on occurrence of event types which have been defined as causing a UQPR. This is done in the Configure Systems Parameters menu (item 1 from the Configure Controller menu, see Section 4.2).

The UQPR is sent out over every control port configured as NMS or Remote NMS on the MLP network. A Master Controller can then initiate a call over the PSTN or X.25 network to bring the occurrence of the event (that occurred on either that Controller or any other in its group) to the attention of the NMS.

If any Controller in the MLP network is SNMP-active it will convert a UQPR to an SNMP trap and the UQPR will not be forwarded via MLP to any other node in the network. A Controller becomes SNMP-active when it receives SNMP on a control port configured as NMS or Remote NMS. It remains SNMP-active until the Controller is reset or it receives MLP traffic on that control port.

A Controller is defined as being a Master (under Configure System Parameters, item 19 Master ID) when it is required to initiate a call and has a physical link to either the PSTN or an X.25 network. All other Controllers within the network are defined as Slave (under Configure System Parameters, item 19).

A maximum of four Masters (all of which must be set to Remote NMS) may be defined within a single group, each having an independent link to the PSTN or X.25 network.

If a group has four Controllers defined as Master, a Slave will attempt to send a UQPR to Master 1, the first retry to Master 2, the second retry to Master 3, the third retry to Master 4, then back to Master 1, and so on. Item 20 of the Configure System Parameters screen (see Section 4.2) tells the Slave Controllers how many Masters are defined within their group, so, if set to two, only Master 1 and Master 2 will be tried.

Below are detailed items 21 to 24 of the Configure System Parameters screen (see Section 4.2) that are associated with UQPR set up.

Item 21 'UQPR Type' of the Configure System Parameters menu is used to indicate which groups of events will cause a UQPR to be sent.

D = Disabled
B = Events classified as Major Alarm
A = Events classified as either Alarm or Major Alarm
M = All classified events (Monitor, Alarm and Major Alarm).

On receipt of a UQPR, the NMS will read the event logs from the Controller.

With an option other than disabled being selected, a UQPR will also be generated if either the Alarm or Monitor event log becomes 80% full.

Item 22 'UQPR Timeout' defines the time in minutes that your Controller will wait, expecting to receive a call from the NMS, before re-sending the UQPR.

Item 23 'UQPR Attempts' defines the number of retries your Controller will initiate, if no response to a UQPR is received from the NMS. Entering a value of 0 defines an infinite number of retries.

Item 24 'UQPR First' defines the Master Controller to which the first UQPR is addressed. In a sequence it can be addressed to either the First Master Controller (that defined as Master 1) or the last Master Controller from which it was successful in contacting the NMS.

For a more detailed explanation of NMS connectivity, the use of multi-Controllers etc, refer to your Network Management System manual.

Figure 11-1 illustrates a simple example where there is one Master Controller within the group and that is configured with the Master ID of Master 1. All other Controllers are set to Slave.

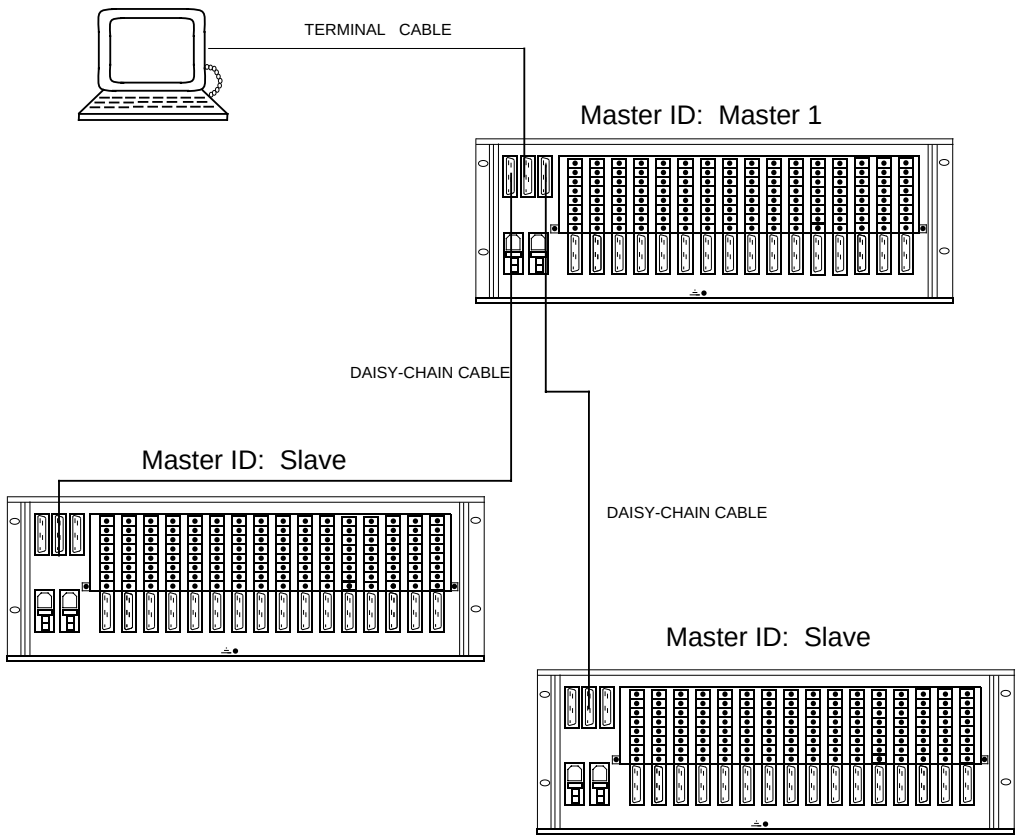


Figure 11-1 Example of Master/Slave Set-up for Event Handling

11.3 Head Controller and Head Printer

You can define up to seventeen Network 16 controllers as a logical domain which allows each controller to display the status of the others. This facility also provides a transparent login from one system to another and can provide a centralised printer event log and active alarm reporting.

It is not necessary to designate one controller as *the* Head Controller, as you can use them all identically. However, it is necessary to configure the domain list on each controller to be used as a Head Controller with a list of all the others within the domain.

Head Controller

When a user logs on to a Head Controller it will send a status poll to all the others defined in its domain list (i.e. those configured as In Service).

The Head Controller will then continue to poll, at the programmable polling interval, all the controllers that responded.

Head Printer

The Head Printer facility allows the printer log output from all the controllers within a domain to be printed on a single central printer.

It is provided in addition to the local printer facility, so it is possible to print events both locally on each controller's printer (set via Main Menu option 7, option 1, item 16), and remotely on the 'Head Printer' controller's printer (see Section 11.3.1). The type of events to be printed locally can be different from those to be printed remotely, for example, *all* events can be printed locally, and alarms *only* printed remotely.

The Head Printer must be within a domain of remote systems and only *one* controller can be configured as the Head Printer within a domain.

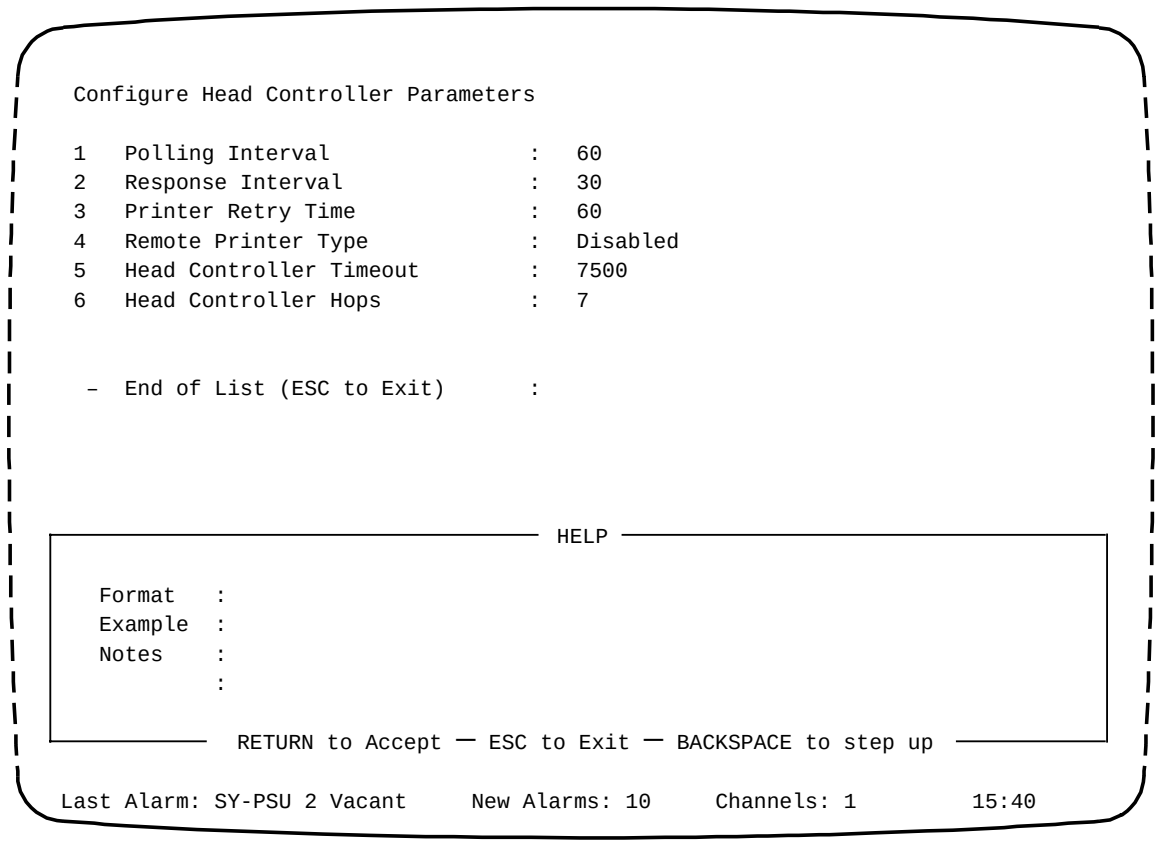
When a remote controller has an event to be printed it creates a message which includes all the information needed for printer output at the Head Printer. The Head Printer will save the printer event in an internal file until the printer is available.

Once the event has been printed, the Head Printer sends an acknowledgement to the remote controller allowing the next printer event to be sent. The remote controller expects to receive this acknowledgement within the printer retry time. If the acknowledgement is not received, the remote controller will resend the message until an acknowledgement is

received. The Head Printer recognises duplicate messages and ignores them.

11.3.1 Configure Head Controller Parameters

When you select **H**(ead Setup) from the Remote Systems screen (Main Menu option 5) the following screen is displayed:


Configure Head Controller Parameters
1 Polling Interval : 60
2 Response Interval : 30
3 Printer Retry Time : 60
4 Remote Printer Type : Disabled
5 Head Controller Timeout : 7500
6 Head Controller Hops : 7
– End of List (ESC to Exit) :
HELP
Format :
Example :
Notes :
RETURN to Accept — ESC to Exit — BACKSPACE to step up
Last Alarm: SY-PSU 2 Vacant
New Alarms: 10
Channels: 1
15:40

The parameters that you can configure are as follows:

Item 1. This parameter defines the remote system polling intervals in seconds. If set to 0 there will be no automatic polling.

Item 2. You can define the minimum time, in seconds, within which a remote system is expected to respond before being flagged as faulty.

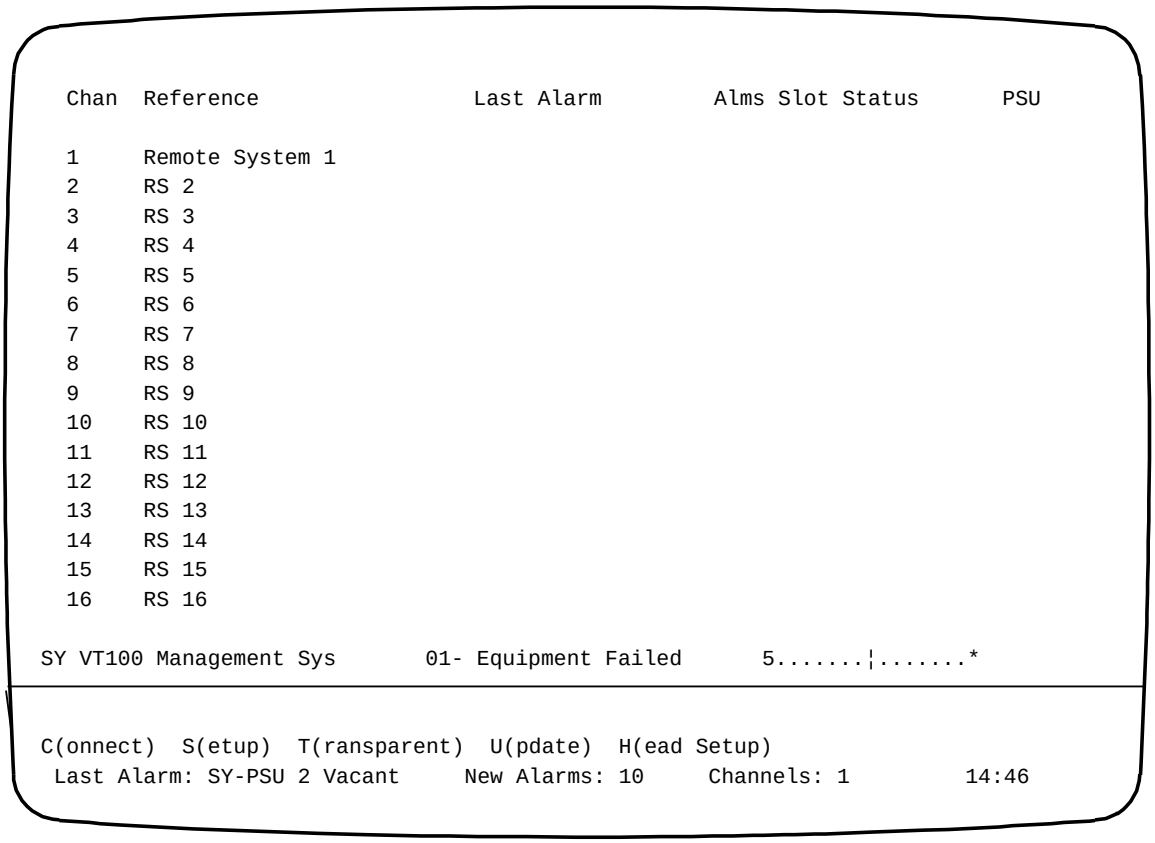
Item 3. The printer retry time determines the interval frequency, in seconds, that the printer will reattempt to print.

Item 4. The remote printer type can be set to Head Printer so that this controller will print all other Controllers' messages. Alternatively it can be disabled, or can be set to to print Monitor Events, Alarm Events or Major Events. If configured to an option other than 'Head' (or disabled), this Controller will send its printer output to another Controller which must be configured as Head Printer.

11.3.2 **Remote Systems** (Main Menu Option 5)

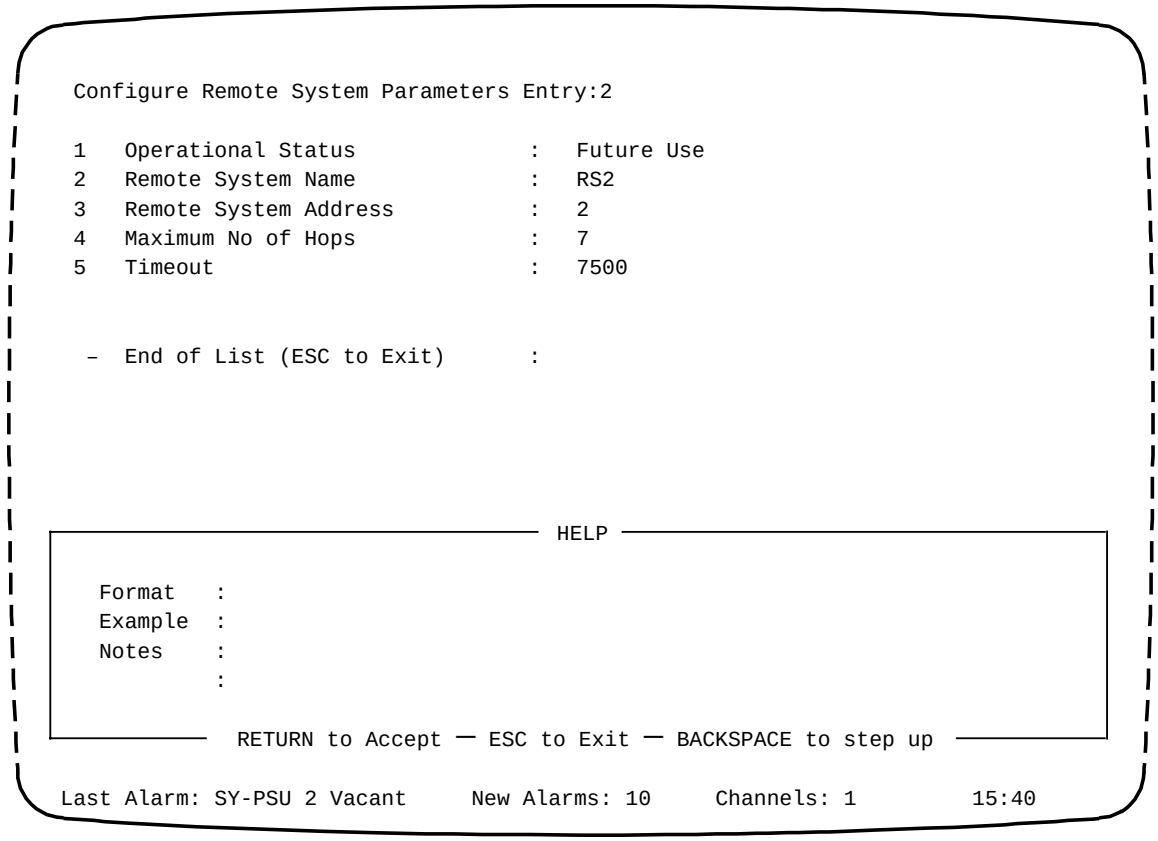
(Refer to Section 8.2 for further information on the Direct Connection – NMS mode.)

Select option 5 from the Main Menu to display the Remote Systems screen, for example:


Chan Reference Last Alarm Alms Slot Status PSU
1 Remote System 1
2 RS 2
3 RS 3
4 RS 4
5 RS 5
6 RS 6
7 RS 7
8 RS 8
9 RS 9
10 RS 10
11 RS 11
12 RS 12
13 RS 13
14 RS 14
15 RS 15
16 RS 16
SY VT100 Management Sys 01- Equipment Failed 5.......¦.......*
C(onnect) S(etup) T(ransparent) U(pdate) H(ead Setup)
Last Alarm: SY-PSU 2 Vacant New Alarms: 10 Channels: 1 14:46

Configure Remote System Parameters

You can define a list of up to sixteen remote Controllers to which you may require VT100 access or status monitoring. To configure the remote system parameters scroll the cursor to the required remote system and select **S**(etup). This produces the following screen:


Configure Remote System Parameters Entry:2
1 Operational Status : Future Use
2 Remote System Name : RS2
3 Remote System Address : 2
4 Maximum No of Hops : 7
5 Timeout : 7500
– End of List (ESC to Exit) :
HELP
Format :
Example :
Notes :
RETURN to Accept — ESC to Exit — BACKSPACE to step up
Last Alarm: SY-PSU 2 Vacant
New Alarms: 10
Channels: 1
15:40

The variable parameters are:

Item 1. You can define the operational status as: In Service, Out of Service or for Future Use.

Item 2. This is the descriptive name you can give to a remote system.

Item 3. The remote system address is the address set on the DIP switches (in Hexadecimal (1-FFF)) of each individual Controller. (See Appendix G for details.)

Item 4. This parameter is the maximum number of hops that can make up the data route from your Controller to the remote Controller with which you are connecting.

Item 5. You can define the timeout period in milliseconds: minimum = 100, maximum = 25500 (for example, 7500ms = 7.5 seconds). The timeout is the maximum pause that the Controller will wait while expecting to receive a reply from the remote system, before attempting to resend the message. A maximum of three attempts will be made.

Connect to a Remote System

From the main Remote Systems screen, select one of the list of named Controllers and choose option **C**(onnect) to initiate a direct connection to that Controller.

Having made the direct connection, the local Controller will bring up the log-on sequence from the remote Controller (press return or enter password at the prompt).

Note that many of these functions are accessible via Main Menu option 7, option 8, however, this is for compatibility with older systems and is not recommended.

11.4 SNMP

The Controller is provided with SNMP (Simple Network Management Protocol), an Internet standard, for managing network devices.

SNMP makes the Network 16 rack system (and Network 6) compatible with the DomainView network management system. SNMP is transparent to the user and does not require any configuration. (For more information on controlling your modem network from DomainView, please refer to the DomainView Network 16/6 MM User Guide.)

If you are going to use SNMP you will find the following information useful:

– An SNMP node converts between SNMP and the native MAP/MLP protocols used by slave nodes. All these protocols can co-exist in the SNMP node without requiring any change to the user interface.

– SNMP network management is available via any control port configured as NMS or Remote NMS. SNMP messages (encapsulated by X.25 or SLIP) are automatically detected and processed by the SNMP node.

– The SNMP node will convert UQPRs into SNMP Traps, but only when enabled to do so by the NMS.

– The SNMP node will process all messages whose final 12 bits match the head node as though they were addressed locally until the NMS changes the 'Base Address' for the domain; this then acts as an address filter.

– A Network 16 control port which is used for SNMP must have XON/XOFF flow control disabled, otherwise any DC1 or DC3 characters received on the port will be discarded.

– Network 16 supports fragmentation and reassembly of IP datagrams on X.25 connections using the method described in RFC 877.

– Network 16 supports reassembly of IP datagrams on SLIP connections.

Should you require any further information on SNMP you can obtain a copy of Network 16/6 Management Control Protocols (part numberX450-312251) from Cray Communications.

12 X.25 Compatibility

12.1 Introduction

X.25 is a packet-switched protocol defined by the CCITT, which supports both Permanent Virtual Circuits (PVCs) and Switched Virtual Circuits (SVCs). This allows any device connected to the X.25 network to connect to any other device within the same network, on a permanent or an as-needed basis.

X.25 networking uses multiplexing techniques which permit a number of virtual circuits on a single physical link to co-exist, allowing more than one application to be supported at any particular time. The use of sub-addressing, when placing a call, enables your Controller's X.25 interface to support a VT100 application on one logical channel (Section 12.2), at the same time as supporting its 'primary' application (as defined in the Configure Port Parameters menu) on another logical channel.

This synchronous X.25 capability is only supported on a single Control Port of your Controller: **CONTROL 2** on the Network 16 Controller Module, or **CONTROL 1** on the Network 6. This port is a 25-way physical DCE which complies with V.24/V.28 specifications.

The control port of your Controller has a 'primary' application that you have defined to be used when DTR is low (when DTR is high the control port only supports a VT100 terminal application).

The X.25 interface allows concurrent applications to be supported, making it possible to support both the primary and VT100 applications at the same time. It is however not possible to support multiple instances of the same application: for example, if NMS is set to be the primary application of your X.25 port, only one NMS computer can be online to the Controller at any particular time. Any calls that would result in multiple instances of an application will not be accepted by the Controller.

Your Controller allows a maximum of six logical channels to be defined. Typically, two logical channels would simultaneously be active.

An X.25 call can be made from any remote VT100 terminal, or NMS, in order to remotely interrogate the Controller.

Your Controller can be configured to report Alarm messages to a printer or Network Management System (NMS) by means of an unsolicited X.25 call.

An easily accessed status report on your X.25 connections, detailing data traffic on a per-logical-channel basis, has been provided.

Support is provided for a packet size of 128 bytes only.

12.2 VT100 Terminal Application

To provide a standard VT100 asynchronous terminal interface over the X.25 network, the VT100 terminal could be connected to a PAD, or could be an application running on an NMS or PC. (This application should not be confused with the terminal emulation available via MAP from the NMS).

Any X.25 qualified data packets received by the Controller will be discarded. The Controller will however generate an X.29 Set command, in order to configure the PAD connected to the terminal, when the VT100 user logs on. This Set command is:

– Echo off. X3 parameter 2 (Echo) to value 0 (OFF).

– Forward all characters as fast as possible. X3 parameter 4 (Data Forwarding Timeout) to value 1 (50 ms).

– No line folding. X3 parameter 10 (Line Folding) to value 0 (None).

– No line feed insertion after a carriage return. X3 parameter 13 (Line Feed Insertion) to value 0 (None).

– No editing. X3 parameter 15 (Editing) to value 0 (Off).

Only one VT100 user may log on to the Controller at a time, whether locally or remotely attached. An attempt to establish a second log-on will result in the Controller sending a busy message to the user, with the call being cleared.

When the VT100 user logs off, the call will be cleared by the Controller.

The VT100 terminal application can be run concurrently with one of the 'primary' applications of the X.25 port, described in Section 12.3.

12.3 Primary Applications

12.3.1 Network Management

Network Management over the X.25 network offers the same facilities as in asynchronous operation of Network Management.

It is the responsibility of the NMS to establish and clear calls to the Controller as required.

12.3.2 Remote Network Management

This is a variant of the Network Management Application. It provides the same functionality as with Network Management, but with the addition that the Controller is able to initiate a call to the NMS, when an event occurs which has been defined as generating a UQPR by any Controller within the group.

This provides the same functionality as is provided asynchronously by the Controller, except that the X.25 network instead of a modem is used to place the call over the PSTN, the Controller calling the address held in 'Remote Address (NUA)' of the Configure X.25 Parameters menu (see Section 12.4).

It is important that all Controllers in the group are cascaded together in NMS mode, as described in Section 11.3.

12.3.3 MAP Application

The MAP (Mayze Application Protocol) application is a sub-set of the NMS mode, but with no link or network level protocols, and hence no onward daisy-chaining is available. It is the responsibility of the NMS to establish and clear calls to the Controller as required.

12.3.4 Printer and Alarm Applications

The Printer application provides the same functionality as with asynchronous operation. When an event that is defined to be printed occurs, an X.25 call is placed by the Controller calling the address held in Remote Address (NUA) of the Configure X.25 Parameters menu (see Section 12.4).

Once the call is established, the event is printed and then the call is dropped. This application is a dial out application only, it is not possible to call into a Printer application.

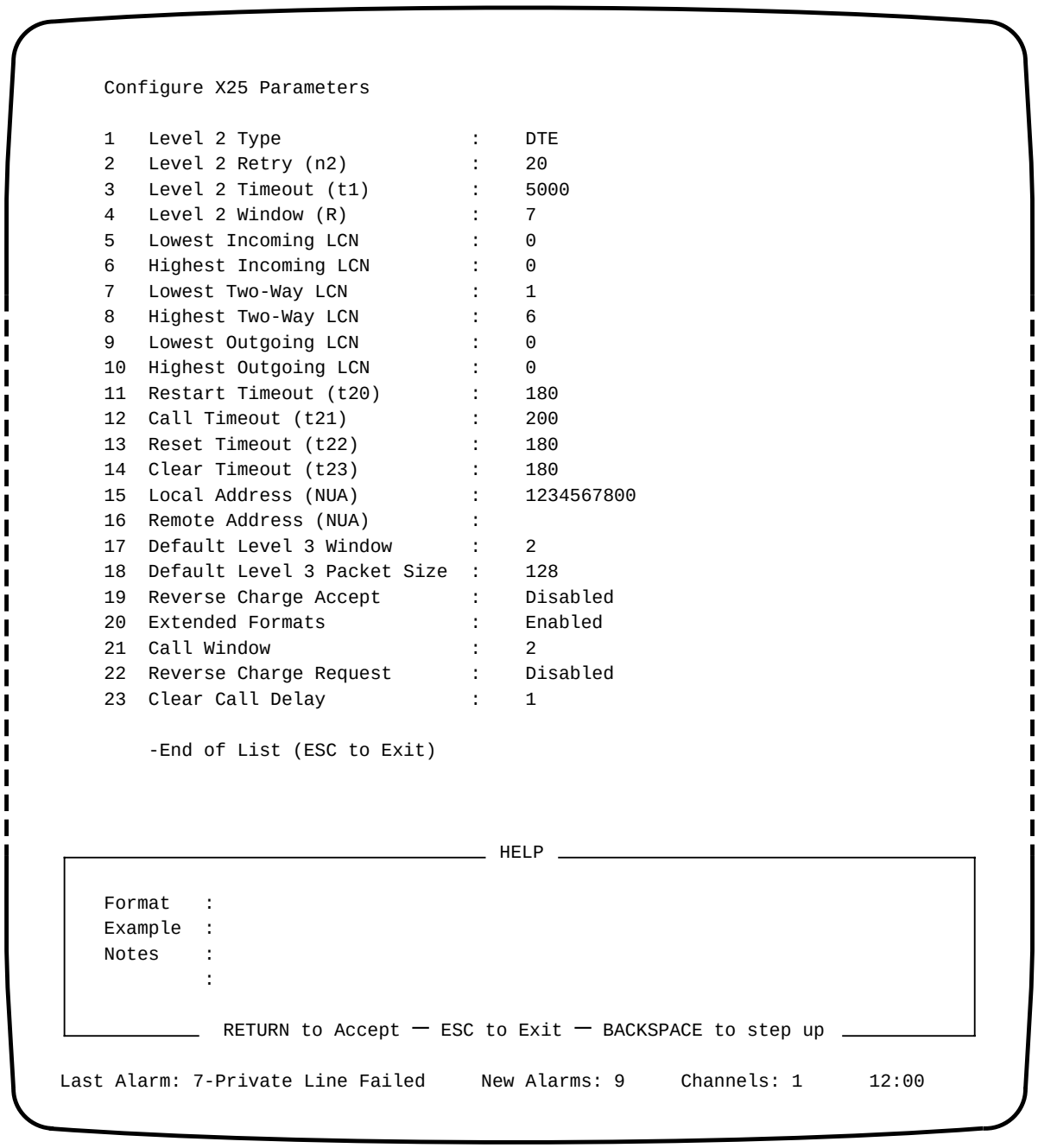
The Alarm application is similar to the Printer application. The Alarm application only initiates a call when a 'Major Alarm' occurs (the Printer application can be programmed to print any or all levels of events). Once a call has been established under the Alarm application, all unacknowledged events are printed before clearing the call.

12.4 Configure X.25 Parameters

All the X.25 operating parameters are software configured by selecting item 7 from the Configure Controller menu to enter the Configure X.25 Parameters screen. The 23 input items are arranged in hierarchical form: follow the screen prompts and use the instructions shown on the 'Help' screens to work your way through each of the configuration parameters; use your Return key after each item to take you sequentially through each parameter.

An example complete configure X.25 Parameter menu with the default configuration settings is shown below.

Remember, it is always possible to exit back to the previous menu by means of the **ESC** key.


Configure X25 Parameters
1 Level 2 Type : DTE
2 Level 2 Retry (n2) : 20
3 Level 2 Timeout (t1) : 5000
4 Level 2 Window (R) : 7
5 Lowest Incoming LCN : 0
6 Highest Incoming LCN : 0
7 Lowest Two-Way LCN : 1
8 Highest Two-Way LCN : 6
9 Lowest Outgoing LCN : 0
10 Highest Outgoing LCN : 0
11 Restart Timeout (t20) : 180
12 Call Timeout (t21) : 200
13 Reset Timeout (t22) : 180
14 Clear Timeout (t23) : 180
15 Local Address (NUA) : 1234567800
16 Remote Address (NUA) :
17 Default Level 3 Window : 2
18 Default Level 3 Packet Size : 128
19 Reverse Charge Accept : Disabled
20 Extended Formats : Enabled
21 Call Window : 2
22 Reverse Charge Request : Disabled
23 Clear Call Delay : 1
-End of List (ESC to Exit)
HELP
Format :
Example :
Notes :
RETURN to Accept — ESC to Exit — BACKSPACE to step up
Last Alarm: 7-Private Line Failed
New Alarms: 9
Channels: 1
12:00

The significance of the variable parameters is:

Item 1. This is the logical DTE/DCE nomination for the X.25 link (level 2). (This should not be confused with the physical nomination which is always as a DCE, and the packet mode (level 3) nomination which is always a DTE.)

Items 2, 3 and 4. Define the level 2 (link level) parameters. Item 2 defines the number of frame re-try attempts allowed before a link is defined as down. Item 3 is a timer (in 1 ms units) which sets the time

before a re-try attempt is made. Item 4 defines the maximum number of outstanding frames permitted, in the range 1 to 7.

Items 5 to 10. The Controller will only support SVCs (other than the Restart channel), and allows for a maximum of six logical channels in addition to the Restart channel to be defined. These items are used to define the usage of those six logical channels. A range of channels can be defined for each pair (lowest incoming and highest incoming, lowest two-way and highest two-way, etc).

As default, all six channels are allocated to two-way channel usage, as indicated by the lowest two-way being set to 1 and the highest two-way being set to 6.

Items 11 to 14. These are level 3 watchdog timers (in 1-second units). Their default values should be sufficient for normal use.

Item 15. This is the local Controller's X.25 network address. It is an X.121 type address with a maximum length of 15 digits.

Since a number of applications are available concurrently, sub-addressing is used to define the different applications. The address specified for the Controller will be the global address onto which will be added the sub-address of the various applications. The last two digits of the Controller address would normally be '00' for X.121 sub-addressing.

Sub-Address	Application
00	Global application
01	VT100 terminal
02	Primary application, i.e. NMS; Alarm; Printer
03	Test – Echo application

If the Global address is issued, bytes 5 and 6 of the call user data are used to address the application. Both bytes must be present, and must be encoded in ASCII.

Item 16. Used to store the X.25 Address that the Controller will call when requested to do so, in order to report an event as defined in Alarm, Printer mode or Remote NMS mode.

Items 17 and 18. Define the default level 3 window size and packet size (128 bytes).

Items 19 and 22. Define whether reverse charge calls will be accepted or not on incoming calls, and whether they will be initiated or not on outgoing calls.

Item 20. Used to define whether the Controller will transmit extended format Call Accept and Clear Request packets.

Item 21. Define the level 3 window size facility to be requested in outgoing calls.

Item 23. When printing via an X.25 port you can set a Clear Call delay (in a 100ms units) to enable the end of the print message to get through. Alternatively, it may be possible to get the remote end to clear the call by sending it an X.29 Invitation to Clear (set the parameter to 0).

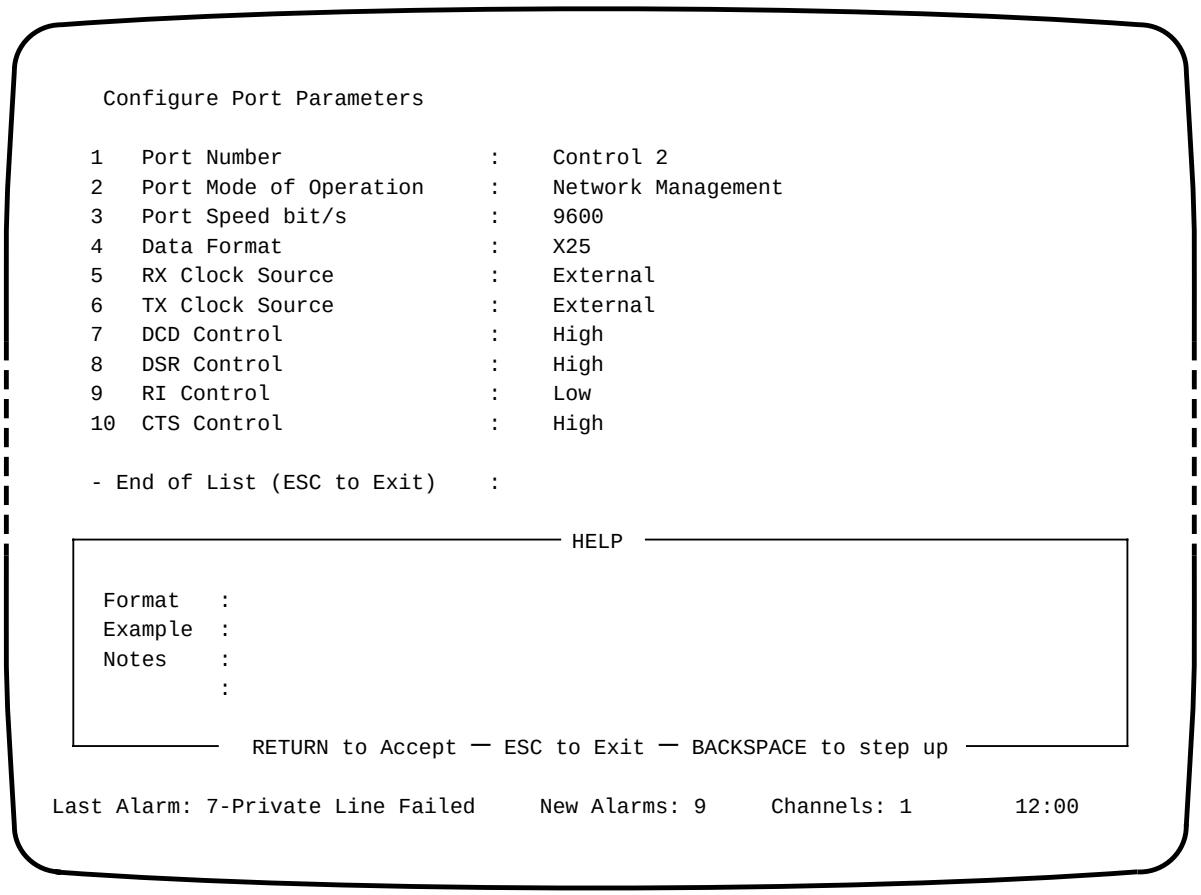
Press **<CR>** to accept the final item, and your Controller Module will return you to the Configure Controller menu.

12.5 Configure Control Port Parameters

The Control 2 port on a Network 16 Controller Module, and Control 1 port on a Network 6 can be configured for use on the X.25 network – with access for a VT100 terminal and 'primary' mode.

If DTR is low (a VT100 terminal is not connected), the port will operate in primary mode, offering synchronous connection to the X.25 network. When a VT100 terminal is attached, it raises DTR, your Controller recognises this, and automatically sets the port to autobaud (300 to 9600 bps), with 7 data bits even parity and 1 stop bit, and with all control signals (except RI) high. When the user logs off, DSR is dropped for 200 msec.

Shown below is the complete Configure Port Parameter input (editing) screen for the **CONTROL 2** port (**CONTROL 1** on the Network 6), listing the default configuration settings. The menu items are arranged in hierarchical form: as with the menu you have just worked your way through (the Configure X.25 Parameters menu), you are initially only presented with the first of the items: use your Return key after each item to take you sequentially through each parameter.


Configure Port Parameters
1 Port Number : Control 2
2 Port Mode of Operation : Network Management
3 Port Speed bit/s : 9600
4 Data Format : X25
5 RX Clock Source : External
6 TX Clock Source : External
7 DCD Control : High
8 DSR Control : High
9 RI Control : Low
10 CTS Control : High
- End of List (ESC to Exit) :
HELP
Format :
Example :
Notes :
RETURN to Accept — ESC to Exit — BACKSPACE to step up
Last Alarm: 7-Private Line Failed
New Alarms: 9
Channels: 1
12:00

Item 2. Invites you to define the primary mode of operation for the port. The six options are: User; Printer; Alarm; Network Management; Remote NMS; MAP. Each of these application options is fully described in Chapter 4.

Item 4 must be set to **X** for the port to be used for synchronous X.25 operation.

Items 5 and 6 offer you the choice of setting transmit and receive clock sources to internal or external.

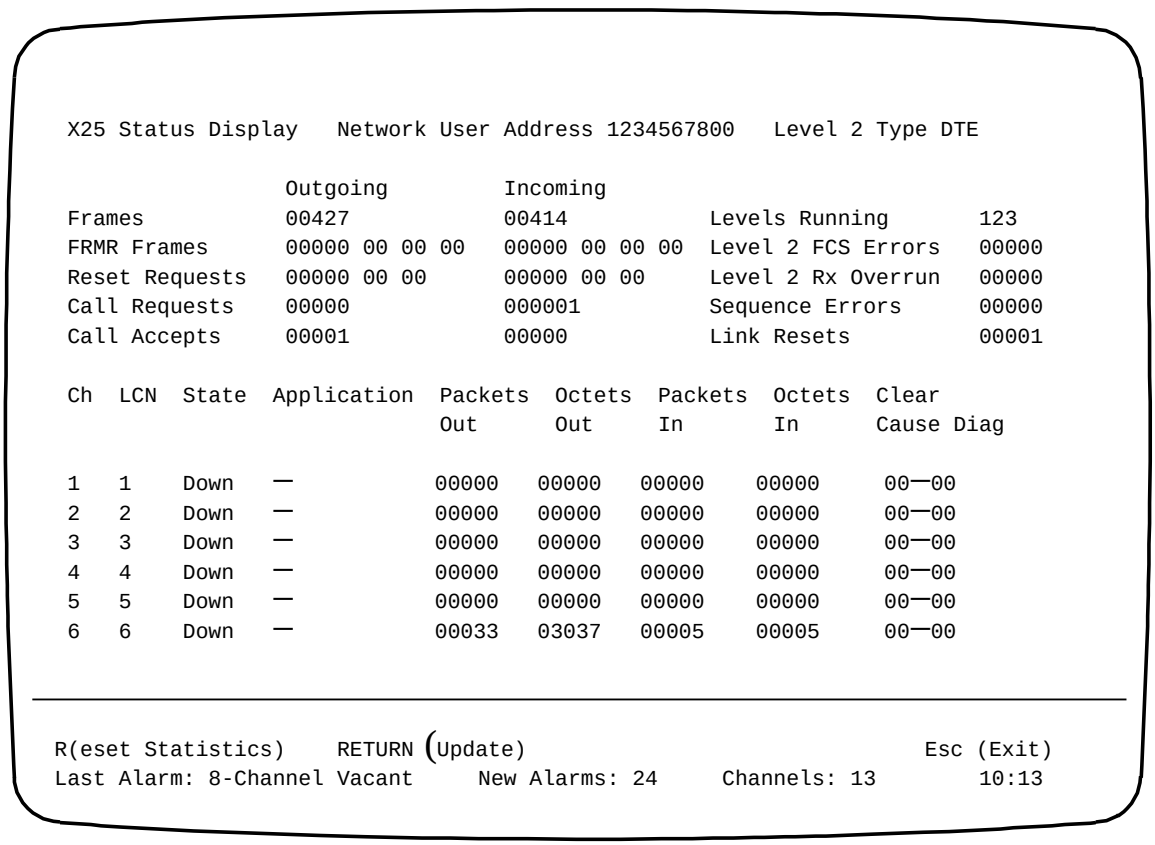
Items 7, 8, 9 and 10 allow the control signals to be set to the state, high or low, required by the application.

12.6 X.25 Diagnostics

Item 2 of the Main Menu enables you to select and display the status of the X.25 link, a single equipment channel, or the system, and display its current status.

Entering **X** at the prompt will select the X.25 Status Display, giving details of the frame and packet levels, incoming/outgoing frames and packets, as well as a comprehensive breakdown of the activity on each logical channel.

Below is an example of the screen shown for the X.25 channel.



```
X25 Status Display   Network User Address 1234567800   Level 2 Type DTE

                 Outgoing          Incoming
Frames           00427             00414            Levels Running       123
FRMR Frames      00000 00 00 00    00000 00 00 00   Level 2 FCS Errors   00000
Reset Requests   00000 00 00       00000 00 00      Level 2 Rx Overrun   00000
Call Requests    00000             000001           Sequence Errors      00000
Call Accepts     00001             00000            Link Resets          00001

Ch  LCN  State  Application  Packets  Octets  Packets  Octets  Clear
                             Out      Out     In       In      Cause Diag

1   1    Down   —            00000    00000   00000    00000    00—00
2   2    Down   —            00000    00000   00000    00000    00—00
3   3    Down   —            00000    00000   00000    00000    00—00
4   4    Down   —            00000    00000   00000    00000    00—00
5   5    Down   —            00000    00000   00000    00000    00—00
6   6    Down   —            00033    03037   00005    00005    00—00


R(eset Statistics)    RETURN (Update)                          Esc (Exit)
Last Alarm: 8-Channel Vacant     New Alarms: 24     Channels: 13        10:13
```

where:

FRMR Frames is a count of the number of level 2 Frame Reject frames sent and received. The fields which follow the numeric indication of FRMR frames are the 3 octets of data present in the FRMR frame, which encode the possible cause of the reject:

aa bb cc where aa = Control field of FRMR frame in hexadecimal.
bb = V(R) and V(S) in hexadecimal.
cc = W, X, Y and Z flags in hexadecimal.

Reset Requests indicates the number of level 3 Reset Packets sent and received, followed by the Cause and Diagnostics octets used to define the possible reasons for the reset:

cc dd where cc = Octet 1 of Reset packet (Cause field) in hexadecimal.
dd = Octet 1 of Reset packet (Diagnostic field) in hexadecimal.

Levels Running indicates the state of the X.25 link:

None = Level 1 down.
1 = Level 1 up.
12 = Levels 1 and 2 up.
123 = Levels 1, 2 and 3 up.

Sequence Errors provides a count of the number of level 2 N(S) Sequence errors. A Sequence error occurs when the Controller receives a level 2 frame with a sequence number that is other than one higher than the last frame received. This can be caused by a poor level 1 link, or by the Controller not being able to process incoming level 2 frames quickly enough, causing the buffers to overflow.

Logical Channel State indicates the state of the logical channel, which can be Up (a call is currently active on this logical channel) or Down (no call is active).

Logical Channel Application indicates the current application using the logical channel, which can be VT100, Primary Application (i.e. NMS, Printer etc) or Test Echo (a test application).

Clear Cause and Diagnostic displays the Cause and Diagnostics fields of the last Clear Request packet on the logical channel, displayed in hexadecimal.

Appendix A Specification Summary

Data Input	Serial binary Complies with CCITT V.28 Accepts levels ± 3 volts to ± 25 volts (+) = space, (–) = mark Single wire ground return 3000 to 7000 ohms load
Data Output	Serial binary Complies with CCITT V.28 ± 12 volts nominal Output impedance 300 ohms
Protocols	VT100 mode NMS mode MLP mode MAP mode X.25 SNMP SLIP
Disconnect	Connection cleared on loss of DTR, and/or, no activity for n seconds

Power Supply (Network 16 only)

Three Voltage Tracks	+20 VDC – consumption 1 watt +10 VDC – consumption 1 watt – 20 VDC – consumption 2.5 watts

Power Supply (Network 6 only)

Input Voltage	220 to 240 VAC
Input Frequency	47 to 63 Hz

Environmental

Temperature	+5 to 40°C operating –25 to +55°C for storage

Relative Humidity	5 to 95% non-condensing
Altitude	3000 metres maximum

Physical (Network 16 only)

Height	157 mm
Width	20 mm
Depth	302 mmm
Weight	0.5 Kg

Physical (Network 6 only)

Height	45 mm
Width	190 mm
Depth	275 mm

Alarm Relays (Network 16 only)

Maximum Voltage	60 VDC
Maximum Current	1 Amp

Fuse (Network 6 only)	500mA(T) anti-surge mains fuse Always disconnect mains before replacing this fuse

Caution: for continued protection against risk of fire, replace only with same type and rating of fuse.

Other Weights

Rack with one PSU	6.17 Kg
PSU	2.75 Kg
Typical Rack Card	0.4 Kg
Typically fully populated rack with two PSUs	15.82 Kg

Appendix B Port Specifications

B.1 Network 16 Supervisor and Control Ports

These are the three female V.24 connectors in the upper left-hand rear of Network 16 labelled **CONTROL 1**, **SUPERVISOR** and **CONTROL 2**.

B.1.1 CONTROL 1

This is a VT100 and user-definable asynchronous DCE port. It also has alarm relay signals. Its pin assignments are:

PIN	NAME/FUNCTION	COMMENTS	DIRECTION
1	(Grd) Protective Ground	Connect one end only	Common
2	(TxD) Transmit Data	Data from DTE	In
3	(RxD) Receive Data	Data from DCE	Out
4	(RTS) Request To Send	Control from DTE	In
5	(CTS) Clear To Send	Control from DCE	Out
6	(DSR) Data Set Ready	Control from DCE	Out
7	(Gnd) Signal Ground	Signal Reference	–
8	(DCD) Data Carrier Detect	Control from DCE	Out
9	Controller Relay	Common	–
10	Controller Relay	Normally Closed	–
11	Controller Relay	Normally Open	–
12	PSU 2 Relay	Common	–
13	PSU 2 Relay	Normally Open when PSU OK	–
14	PSU 2 Relay	Normally Closed when PSU OK	–
15	PSU 1 Relay	Common	–
16	PSU 1 Relay	Normally Open when PSU OK	–
17	PSU 1 Relay	Normally Closed when PSU OK	–
20	(DTR) Data Terminal Ready	Control from DTE	In
22	(RI) Ring Indicator	Control from DCE	Out

The Controller Relay (pins 9-11) switches for 1 second when an event defined as Alarm or Major Alarm occurs.

The PSU Relays (pins 12-14 and 15-17) indicate failed when the relevant PSU is switched OFF, or if it detects an internal failure.

DTE refers to the computer or terminal attached to Control Port 1. DCE refers to the Controller. Connecting cable details are in Appendix C.

B.1.2 SUPERVISOR

This is a VT100 and user-definable asynchronous DCE port. Its pin assignments are:

PIN	NAME/FUNCTION	COMMENTS	DIRECTION
1	(Grd) Protective Ground	Connect one end only	Common
2	(TxD) Transmit Data	Data from DTE	In
3	(RxD) Receive Data	Data from DCE	Out
4	(RTS) Request To Send	Control from DTE	In
5	(CTS) Clear To Send	Control from DCE	Out
6	(DSR) Data Set Ready	Control from DCE	Out
7	(Gnd) Signal Ground	Signal Reference	Common
8	(DCD) Data Carrier Detect	Control from DCE	Out
20	(DTR) Data Terminal Ready	Control from DTE	In
22	(RI) Ring Indicator	Control from DCE	Out

DTE refers to the computer or terminal attached to the Supervisor port. DCE refers to the Controller. Connecting cable details are given in Appendix C.

B.1.3 CONTROL 2

This is a VT100 and user-definable asynchronous DCE port, or alternatively a synchronous X.25 DCE port. Its pin assignments are:

PIN	NAME/FUNCTION	COMMENTS	DIRECTION
1	(Grd) Chassis Ground	Connect one end only	Common
2	(TxD) Transmit Data	Data from DTE	In
3	(RxD) Receive Data	Data from DCE	Out
4	(RTS) Request To Send	Control from DTE	In
5	(CTS) Clear To Send	Control from DCE	Out
6	(DSR) Data Set Ready	Control from DCE	Out
7	(Gnd) Signal Ground	Signal Reference	Common
8	(DCD) Data Carrier Detect	Control from DCE	Out
15	(TxClk) Transmit Clock	Tx Data Clock from DCE	Out
17	(RxClk) Receive Clock	Rx Data Clock from DCE	Out
20	(DTR) Data Terminal Ready	Control from DTE	In
22	(RI) Ring Indicator	Control from DCE	Out
24	(TC) External Tx Clock	Control from DTE	In

DTE refers to the computer or terminal attached to Control Port 2. DCE refers to the Controller. Connecting cable details are in Appendix C.

B.2 Network 6 Supervisor and Control Ports

These are the two female V.24 connectors in the upper left-hand rear of the Controller labelled **SUPERVISOR** and **CONTROL 1**.

B.2.1 SUPERVISOR

This is a VT100 and user-definable asynchronous DCE port. Its pin assignments are:

PIN	NAME/FUNCTION	COMMENTS	DIRECTION
1	(Grd) Protective Ground	Connect one end only	Common
2	(TxD) Transmit Data	Data from DTE	In
3	(RxD) Receive Data	Data from DCE	Out
4	(RTS) Request To Send	Control from DTE	In
5	(CTS) Clear To Send	Control from DCE	Out
6	(DSR) Data Set Ready	Control from DCE	Out
7	(Gnd) Signal Ground	Signal Reference	Common
8	(DCD) Data Carrier Detect	Control from DCE	Out
20	(DTR) Data Terminal Ready	Control from DTE	In
22	(RI) Ring Indicator	Control from DCE	Out

DTE refers to the computer or terminal attached to the Supervisor port. DCE refers to the Controller. Connecting cable details are given in Appendix C.

B.2.2 CONTROL 1

This is a VT100 and user-definable asynchronous DCE port, or alternatively a synchronous X.25 DCE port. The pin assignments are:

PIN	NAME/FUNCTION	COMMENTS	DIRECTION
1	(Grd) Chassis Ground	Connect one end only	Common
2	(TxD) Transmit Data	Data from DTE	In
3	(RxD) Receive Data	Data from DCE	Out
4	(RTS) Request To Send	Control from DTE	In
5	(CTS) Clear To Send	Control from DCE	Out
6	(DSR) Data Set Ready	Control from DCE	Out
7	(Gnd) Signal Ground	Signal Reference	Common
8	(DCD) Data Carrier Detect	Control from DCE	Out
15	(TxClk) Transmit Clock	Tx Data Clock from DCE	Out
17	(RxClk) Receive Clock	Rx Data Clock from DCE	Out
20	(DTR) Data Terminal Ready	Control from DTE	In
22	(RI) Ring Indicator	Control from DCE	Out
24	(TC) External Tx Clock	Control from DTE	In

DTE refers to the computer or terminal attached to Control Port 1. DCE refers to the Controller. Connecting cable details are given in Appendix C.

Appendix C Cable Specifications

C.1 DTE Ports

C.1.1 DTE Only

The cable connecting your DTE to a **DTE** port on the backplane of Network 16 is shown in Figure C-1.

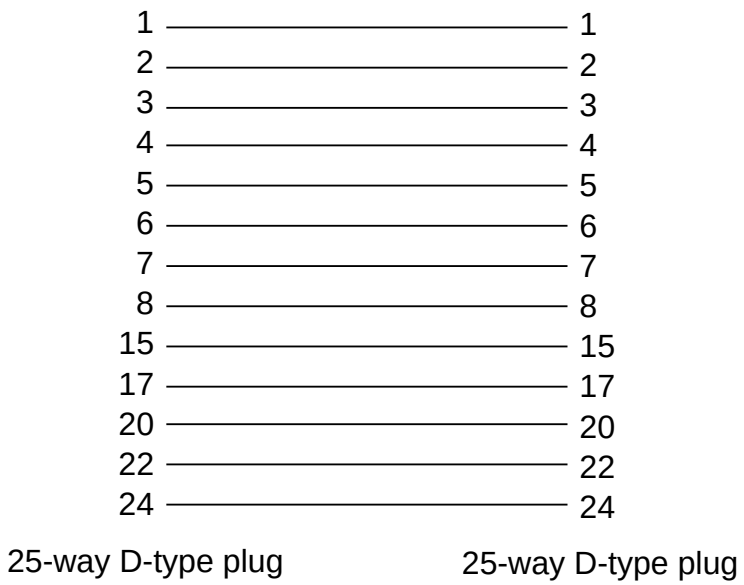


Figure C-1 DTE Data Cable

C.1.2 DTE plus Command Terminal

If you intend to use a command terminal for a modem, the cable connecting your DTE and command terminal to the **DTE** port on the backplane of Network 16 should be a 'Y' cable with the connections shown in Figure C-2:

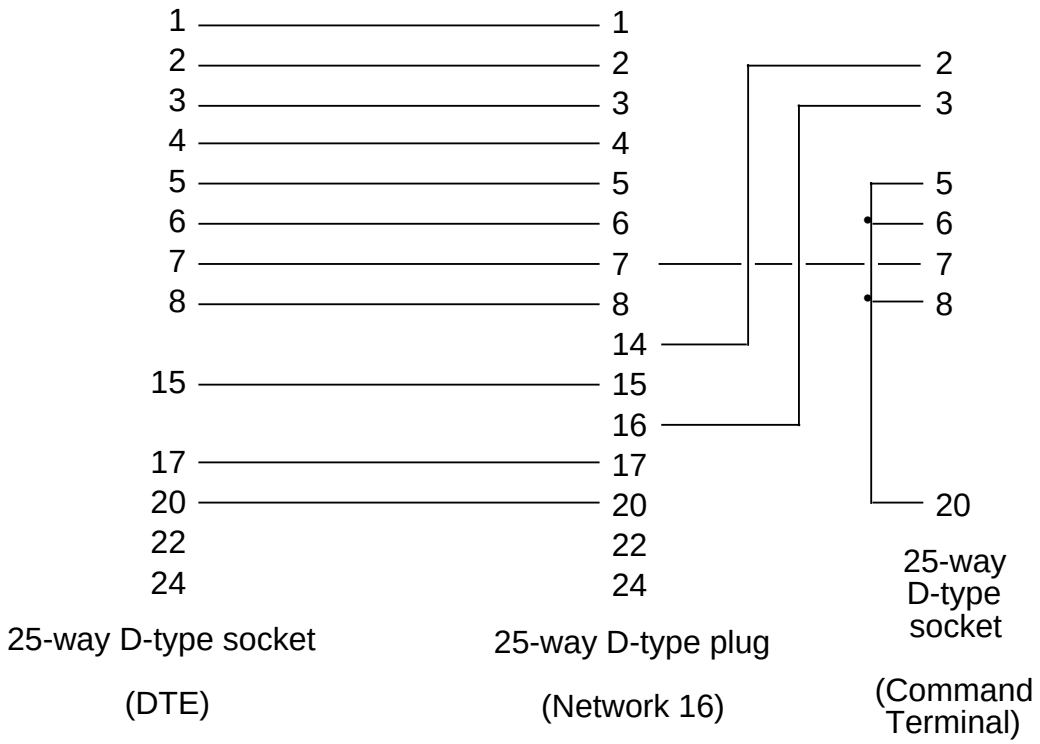


Figure C-2 DTE Data and Command Cable

C.2 Supervisor and Control Ports

For information on using these three ports, see Section 2.2.4 of this manual.

C.2.1 Terminal Cable

The cable connecting your command terminal to the **SUPERVISOR**, **CONTROL 1** or **CONTROL 2** port of Network 16 is shown in Figure C-3.

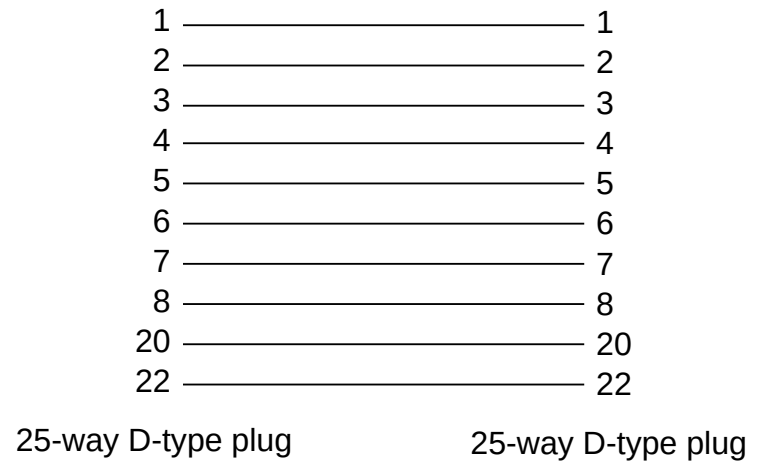


Figure C-3 Terminal Cable

VT100 mode is configured as:

Speed	Autobaud
Format	7 data, even parity, 1 stop bit
S/W Flow Control	Enabled
RTS Flow Control	Enabled
CTS	High
DSR	High
DCD	High
RI	Low

C.2.2 Daisy-Chain Cable

The cables used to daisy-chain a series of Controllers is shown in Figure C-4.

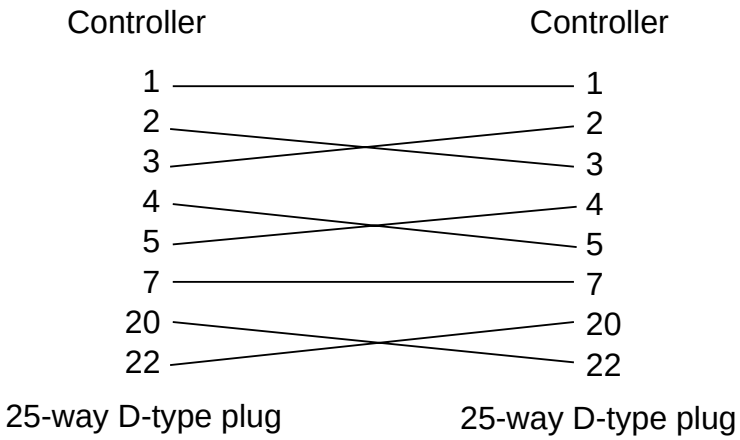


Figure C-4 Daisy-Chain Cable

There are two modes of daisy-chaining that can be used with this cable:

User mode (VT100 operation)

CTS, DSR and DCD can be user-defined.

CTS must be defined as High to enable the remote Controller to transmit if flow control is enabled.

RI will be Low until logon is requested when it will be raised, RI will revert to Low when logon is released.

At the remote Controller RI must be defined as Low, CTS defined as High.

NMS mode (network management protocol in use)

RI must be defined as Low.

Note: There is no flow control between Controllers. If flow control is enabled RTS must be High for the Controller to transmit. A Controller will not lower CTS if its buffer is full.

C.2.3 NMS or Printer Cable

The cable used for linking a Network Management System (PC) or Printer to a port is shown in Figure C-5.

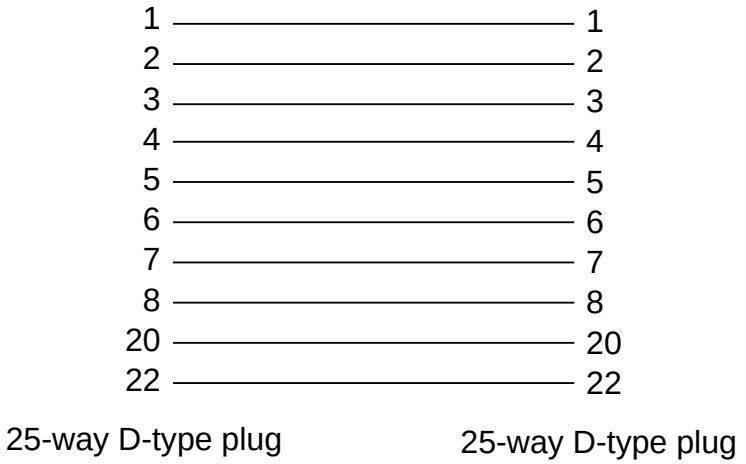


Figure C-5 NMS/Printer Cable

NMS should lower DTR for NMS protocol.
NMS should raise DTR and RTS for VT100 (terminal) access.
Printer must lower DTR.

C.2.4 Synchronous X.25 Cable

The cable used to connect the **CONTROL 2** port to a physical DTE port on an X.25 Switch is shown in Figure C-6.

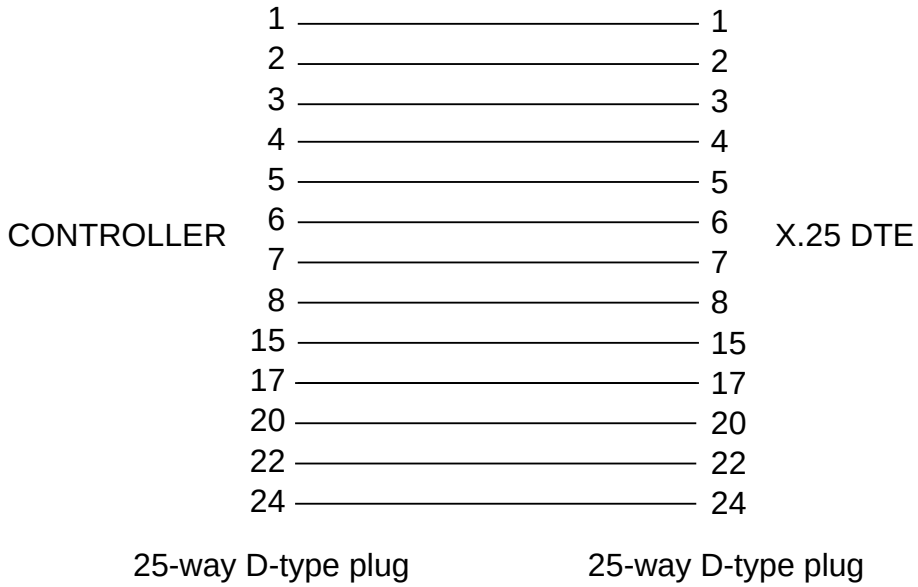


Figure C-6 X.25 DTE Cable

The cable used to connect the **CONTROL 2** port to a physical DCE port on an X.25 Switch is shown in Figure C-7.

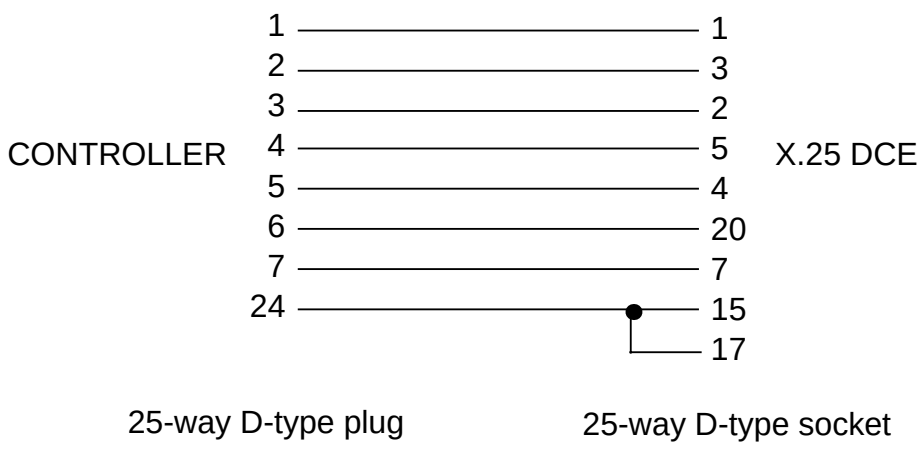


Figure C-7 X.25 DCE Cable

C.2.5 Async Alarm or Remote NMS Cable

The cable used to connect to a **CONTROL** port defined as an asynchronous alarm port or remote NMS is shown in Figure C-8.

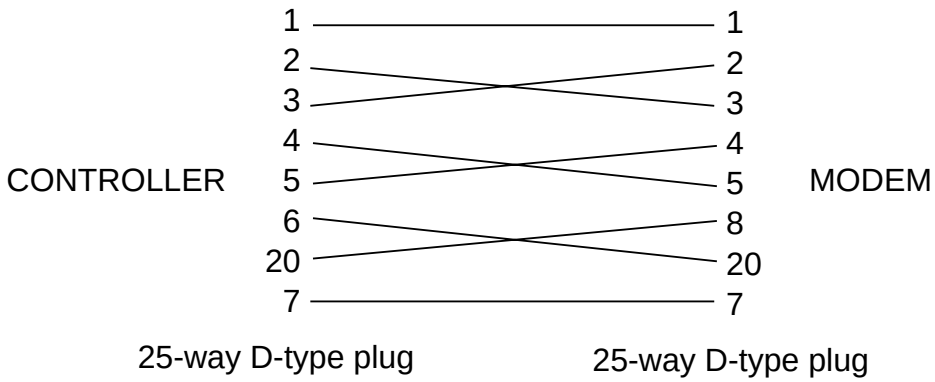


Figure C-8 Async Alarm or Remote NMS Cable

The modem must be configured to raise DCD only when it is on-line (the modem must be set to AT&C1), and linked to DTR on the Controller. In alarm mode this indicates that a terminal is present; in remote NMS mode it indicates that the modem is on-line.

The Controller will raise DSR to originate or answer a call, and drop DSR when it needs to drop the call. DSR on the Controller must be linked to DTR on the modem.

An alarm port can be configured to flow-control on RTS, and on Xon/Xoff. If RTS flow control is to be used, RTS on the Controller must be tied to CTS on the modem. RTS on the Controller must be high.

Appendix D System Events

Below is a list of the system events that can be defined as 'Alarm', 'Major Alarm', 'Monitor' or 'Ignore' (see Section 6.2).

CODE	DESCRIPTION	NOTES
* 1	PSU 1 OK	Power supply 1 running
* 2	PSU 2 OK	Power supply 2 running
* 3	PSU 1 Failed	Power supply 1 has failed
* 4	PSU 2 Failed	Power supply 2 has failed
* 5	PSU 1 Vacant	Slot for power supply 1 is vacant
* 6	PSU 2 Vacant	Slot for power supply 2 is vacant
7	Printer Buffer Full	Controller print queue is full
8	Supervisor Logged On	Terminal access system 'Supervisor' logged on
9	Supervisor Logged Off	Terminal access system 'Supervisor' logged off
10	User Logged On	Terminal access system 'User' logged on
11	User Logged Off	Terminal access system 'User' logged off
12	Dialback Alarm Fail	Dial out alarm call has failed
13	Controller Initialised	Controller card reset from cold
14	Controller Powered On	Controller card powered on
15	Controller Self Test	Controller power on diagnostics
16	Reconfig by VT100	Terminal access system has modified configuration
17	No Free Channels	An attempt has been made to allocate more channels than exist.

*** Events not present on the Network 6.**

Appendix E Channel System Events

Below is a list of the channel system events that can be defined as 'Alarm', 'Major Alarm', 'Monitor' or 'Ignore' (see Section 6.3 of this manual).

CODE	DESCRIPTION	NOTES
* 1	Channel Vacant	Channel equipment removed
* 2	Card Inserted	Channel equipment inserted
3	Invalid Equipment	Incorrect equipment inserted
4	Unknown Equipment	Unknown equipment type
5	Local Response Error	Unknown equipment response
6	Local Response OK	Equipment response recovered
7	Remote Response Error	Remote channel response error
8	Remote Response OK	Remote channel response OK
9	Equipment Failed	Equipment poll failure
10	I Command Accepted OK	Interactive connect OK
11	I Command Failed	Interactive connect failed
12	S Command Accepted OK	Send data command OK
13	S Command Failed	Send data command error
14	Direct Connection On	Direct command port access
15	Direct Connection Off	Direct command port off
16	Loc Config Downloaded	Local configuration downloaded
17	Loc Config Uploaded	Local configuration uploaded
18	Test Started	Test started
19	Test Completed	Test completed
20	Dial-in Security OK	Dial-in security check passed OK
21	Dial-in Security Fail	Dial-in security check failed
22	Ring No Answer	The modem has not answered a call
23	Invalid Download	The configuration to download is of the wrong type
24	Channel Assigned	An internal channel has been assigned to the equipment

* Channel system events 1 and 2 differ on the Network 6. They read:
  1 Channel Disconnected
  2 Channel Connected

Appendix F Channel Equipment Events

Below is a list of the channel equipment events that can be defined as 'Alarm', 'Major Alarm', 'Monitor' or 'Ignore' (see Section 6.3).

CODE	DESCRIPTION	NOTES
1	Connect 300	Connected at 300 bps
2	Incoming Ring	Incoming ring detected
3	Timeout – No DCD	No carrier for a set period
4	Command Error	AT Command generated error
5	Connect 1200	Connected at 1200 bps
6	No Dialtone	Call failure no dialtone detected
7	Busy Detected	Call failure busy detected
8	Call Not Answered	Call failure no remote answer
9	Connect 600	Connected at 600 bps
10	Connect 2400	Connected at 2400 bps
11	Connect 1275	Connected at 1200/75 bps
12	Rem Dig Loop Granted	Remote digital loop granted
13	Rem Dig Loop Denied	Remote digital loop denied
15	Call Aborted	Call aborted
16	Timeout ttttttttttttt	Timeout (followed by the reason)
21	Disconnect No ARQ	Modem disconnected as no ARQ
23	Good Signal Quality	Good signal quality
24	Autologon Timeout	Autologon timeout
25	Call Back Initiated	Security call back initiated
26	Number Blacklisted	PSTN number blacklisted
27	Local Digital Loop	Local digital loop initiated
28	Connect 4800	Connected at 4800 bps
29	Connect 7200	Connected at 7200 bps
30	Connect 9600	Connected at 9600 bps
31	Voice Detected	Voice call detected
32	Remote Ring	Remote ring signal detected
33	Disconnect – Dialtone	Call terminated by dialtone
34	Illegal PSTN Command	PSTN command for leased line
35	Number Delayed	Blacklist delayed telephone no
36	Modem Retrain	Retrain forced
37	Bad Signal Quality	Bad signal quality detected
38	Call Cleared	Call cleared
39	Connect 21600	Connected at 21600 bps
40	Config Does Not Exist	User configuration not stored
41	Disconnect – Busy	Call terminated by busy tone
42	Connect 12.0	Connected at 12000 bps

CODE	DESCRIPTION	NOTES
43	Connect 14.4	Connected at 14400 bps
44	Connect 16.0	Connected at 16000 bps
45	Connect 19.2	Connected at 19200 bps
46	Connect 7512	Connected at 75/1200 bps
47	Connect 24.0	Connected at 24000 bps
48	Connect 36.0	Connected at 36000 bps
49	Connect 38.4	Connected at 38400 bps
50	Private Line Failed	Loss of carrier detected on Private line, for a period greater than that set in modem's S-registers
51	Private Line Ready	Private line autorestoral ready
52	PST 1	Connection on PSTN line 1
53	PST 2	Connection on PSTN line 2
54	Backup Dialling	Dial backup dialling started
58	Private Line Restored	Private line has been restored
59	Dial Backup Failed	PSTN dial backup has failed
60	Remote Logon Granted	Control port remote granted
61	Remote Logon Denied	Control port remote denied
62	Rem Config Uploaded	Remote configuration uploaded
63	Rem Upload Denied	Remote configuration upload denied
64	Rem Config Downloaded	Remote configuration downloaded
65	Rem Download Denied	Remote configuration download denied
66	Rem Download Failed	Remote configuration download failed
67	Rem Upload Failed	Remote configuration upload failed
69	Remote Logon Finished	Control port remote finished
70	Security Check Passed	Password authentication passed
71	Security Check Failed	Password authentication failed
72	Connect 48.0	Connected at 48000 bps
73	Connect 56.0	Connected at 56000 bps
74	Connect 64.0	Connected at 64000 bps
75	Connect 26400	Connected at 26400 bps
76	Connect 28800	Connected at 28800 bps
77	Connect 57600	Connected at 57600 bps
78	Connect 115200	Connected at 115200 bps
79	No Password Call	No password authentication detected
80	No RTS	Timeout RTS loss
81	Cons RTS	Timeout RTS constant
82	Cons DCD	Timeout DCD constant
83	DTE Data	Timeout DTE data loss
84	Line Data	Timeout line data loss
85	No DSR	
86	No TX CLK	No transit clock
87	No RX CLK	No receive clock
88	No S.E.T.	No signal element timing
89	No Indicate	Timeout line data loss

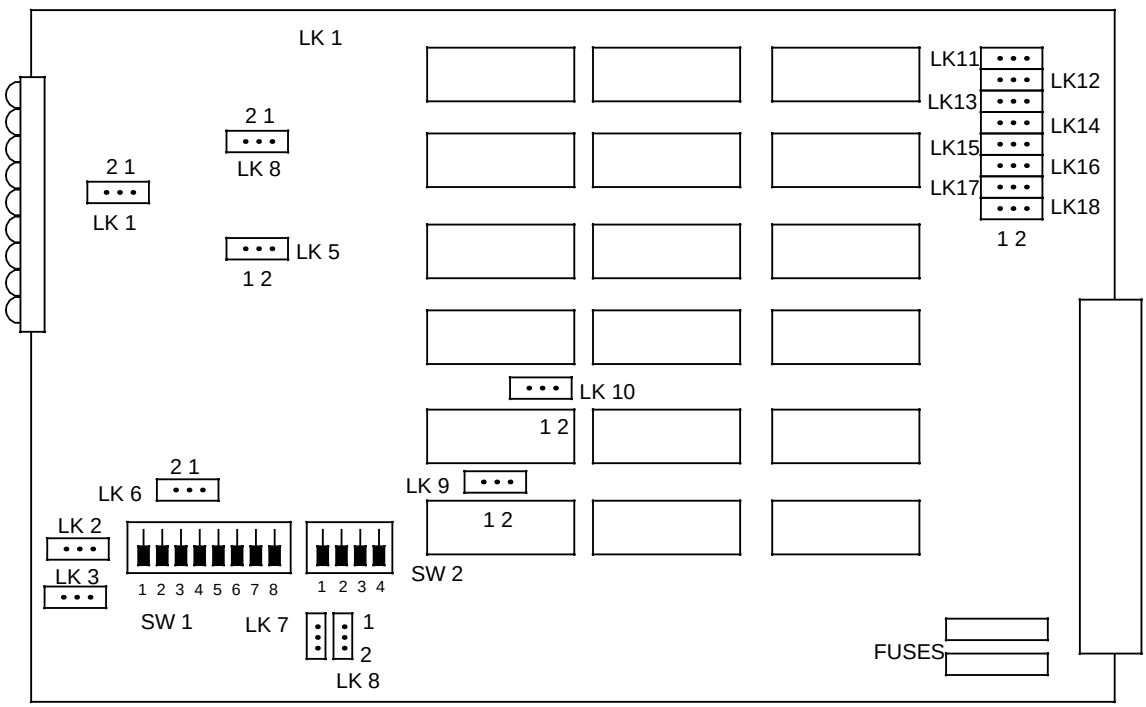
CODE	DESCRIPTION	NOTES
90	No DCD	
91	REL	MNP error connection
92	LAPM	LAPM error connection
96	V42b	V42bis data compression
100	V25 Dialler Busy	V.25 dialler is busy
101	V25 Dialler Free	V.25 dialler is free
103	V25 Dialler Error	V.25 dialler command error
105	D.CCT Fail	Digital circuit failure
106	Dig CCT Ready	Digital circuit ready
107	Dig CCT Restored	Digital circuit restored
110	AL	Analogue loop
111	Data Link Test Denied	Data link test denied by remote
112	Data Link Test Granted	Data link test granted by remote
119	Test Terminated	AL or DL terminated
120	V20	
121	V21	Connected V.21 modulation
122	V22	Connected V.22 modulation
123	V23	Connected V.23 modulation
124	V26	Connected V.26 modulation
125	V27	Connected V.27 modulation
126	V29	Connected V.29 modulation
127	V32	Connected V.32 modulation
128	V33	Connected V.33 modulation
129	Equipment Reset	
197	In D.Load Mode	In download mode (QSM only)
198	Flash CSum Failed	Flash (EPROM) checksum failed (QSM only)

Appendix G Link Options

G.1 Network 16 Controller Module

If you need to alter any of your Controller's links:

1. Make sure the Network 16 Rack is powered OFF.
2. Remove the retaining screws located at the top and bottom of the Controller's front panel.
3. Hold the Controller by the central puller on its front panel, and carefully pull the card out of your Network 16 Rack.
4. To avoid scratching your desk, place the Controller on a sheet of paper with the front panel on the left side as you look at it.
5. Your Controller should look like the diagram below:



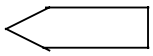
PCB links enable you to make the appropriate connection for your operating mode. However, the majority of them are factory set, and should not be tampered with.

The details are:

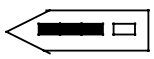
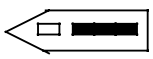
Link LK2 should have its jumper fitted in the pins furthest away from the edge of the board when EPROM U3 is a 2Mbit device, and in the pins nearest the edge of the board when EPROM U3 is a 1Mbit device.

Link LK3 has a jumper fitted in the pins furthest away from the edge of the board when it is necessary to enter an (unpublished) Scope (debugging) Mode on one of the control ports. (This link has an (unnumbered) equivalent on the old PCB in the position of Switch S3.)

Key to link position references:

Link boxes are drawn on the PCB as  but the link positions are not marked.

The link positions are:

POSITION 1 POSITION 2

Battery Backup:

Link 4. Should be in position 1, and should not be changed.

Links set at the factory, do not touch:

Links 1, 5, 6, 9, 10, 11, 12, 15, 16, 17 and 18.

PSU 1 and PSU 2:

Links 7 and 8. Should be in position 1, and should not be changed.

Synchronous Clocks:

Links 13 and 14. Should be in position 2 to enable output of clock signals for use on the X.25 network.

Detailed below is a list of the old Network 16 PCB links and their equivalent new PCB links:

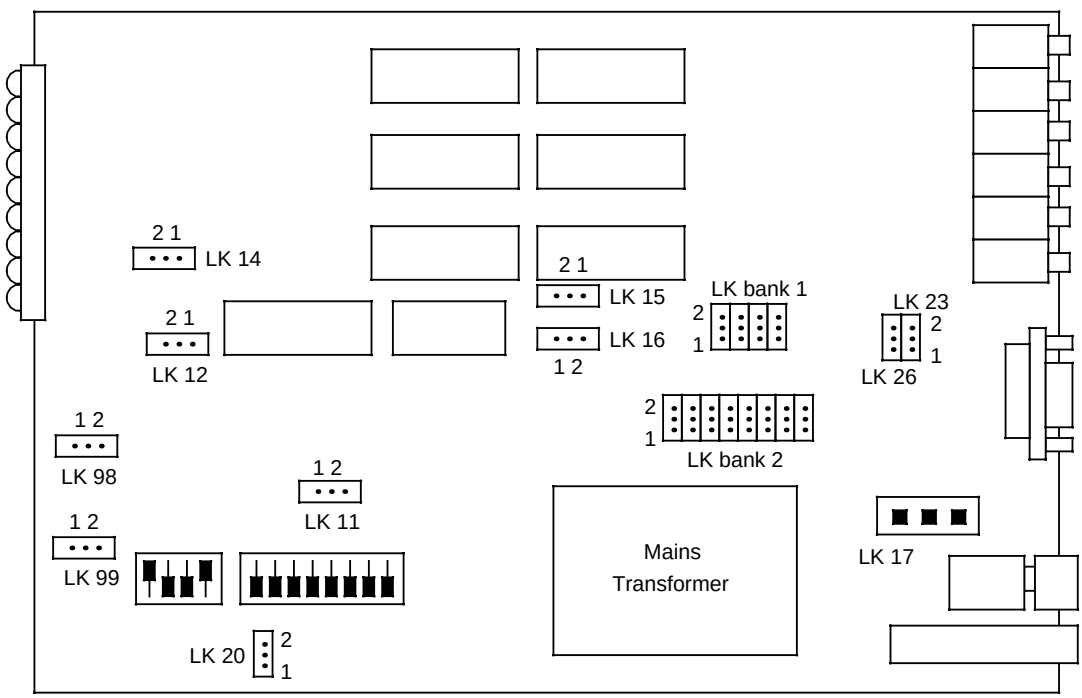
Old PCB	**New PCB**
LK1	not fitted
LK2	LK11
LK3	LK12
LK4	LK13
LK5	LK14
LK6	LK15
LK7	LK16
LK8	LK4

Old PCB	New PCB
LK9	LK17
LK10	LK18
LK11	LK1
LK12	LK5
LK13	not fitted
LK14	LK10
LK15	LK9
LK16	LK6
LK17	LK7
LK18	LK8
	LK2 (see information above)
	LK3 (see information above)

G.2 Network 6 Controller

If you need to alter any of your Controller's links:

1. Power the Controller OFF.
2. Disconnect your terminal from the **SUPERVISOR** port, the six stereo jack connectors from ports 1-6, and any equipment connected to **CONTROL 1**. Then **remove** the mains plug from its supply.
3. Your Controller is secured to the chassis by three back-panel-mounted screws. Remove these screws.
4. Carefully slide the Controller and back panel out from the chassis. Place the Controller in front of you with the front panel LEDs on the left hand side. It is wise to place the PCB on a sheet of paper to avoid scratching your desk.
5. Your Controller should look like the diagram below.

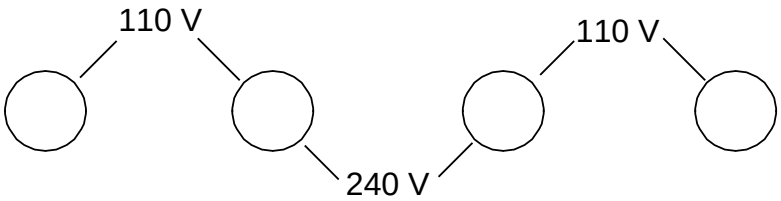


PCB links enable you to make the appropriate connections for your operating mode. However, the majority of them are factory set, and should not be tampered with.

The details are:

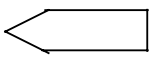
Voltage option:

Link 17: 240 or 110 Volt selection is made with either one or two links as shown below.

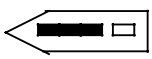
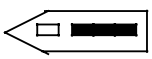


Factory default is 240 Volts.

Key to link position references:

Link boxes are drawn on the PCB as  but the link positions are not marked.

The link positions are:

POSITION 1 POSITION 2

Synchronous Clocks:

Links 5 and 80. Should be in position 2 to enable output of clock signals for use on the X.25 network.

All other links are set at the factory and should not be touched.

Detailed below is a list of the old Network 6 PCB links and their equivalent new PCB links:

Old PCB	**New PCB**
LK1	LK99
LK11	LK11
LK12	LK12
LK13	LK98
LK14	LK14
LK15	LK15
LK16	LK16
LK17	LK17
LK23	LK23
LK26	LK26

Appendix H Printer Output Formats

Printer output format is defined as either Verbose or Terse format. The character reference for each format is defined below.

H.1 Verbose Format

This is the standard text format, in a verbose user-readable form:

Character	Description
1-4	Controller Address, 4 Hexadecimal ASCII character, 0000-FFFF.
5	Space.
6-12	Event Class, 7 ASCII characters, Major, Monitor or Alarm.
13	Space.
14-17	Sequence Number, 4 Digital ASCII digits, 0000-9999.
18	Space.
19-20	Channel Identity, 2 ASCII characters, 01-16 and SY.
21	Space.
22-41	Channel Reference, 20 ASCII characters.
42	Space.
43-64	Event Text, 22 ASCII characters.
65	Space.
66-73	Time, 8 ASCII characters, hh:mm:ss.
74	Space.
75-79	Date, 5 ASCII characters, dd/mm.
80	Carriage Return and Line Feed.

H.2 Terse Format

This output is a short format, designed for integration with a computer.

Character	Description
1-4	Controller Address, 4 Hexadecimal ASCII character, **0000-FFFF**.
5	Space.
6	Event Class, 7 ASCII characters, **B** = **Major**, **M** = **Monitor** or **A** = **Alarm**.
7	Space.
8-11	Sequence Number, 4 Digital ASCII digits, **0000-9999**.
12	Space.
13-14	Channel Identity, 2 ASCII characters, **01-16** and **SY**.
15	Space.
16	Event Class, 1 ASCII character, **X** – Channel Equipment Event, **Y** – Channel System Event or **S** – System event.
17	Space.
18-27	Event Codes, 5 pairs of Hexadecimal ASCII digits, 1st code on the left, **00** = Null event code.
28	Space.
29-36	Time, 8 ASCII characters, **hh:mm:ss**.
37	Space.
38-45	Date, 8 ASCII characters, **dd/mm/yy**.
46	Carriage Return and Line Feed.

Appendix I Application Example

I.1 Configuring Channels Used by a Modem and Associated V.25 Parallel Autodialler

Details of how to physically install a modem with an associated V.25 Autodialler are given in your V.25 Parallel Autodialler's User Manual.

The modem must be configured to be controlled through the DTE interface. The modem must be in the lower numbered slot next to the V.25 Dialler. The Equipment Identity field of the Configure Channel Parameters menu for each of the occupied slots must be set to reflect the equipment that they carry, i.e. V.25 Dialler and modem type.

The Control Method field of the Configure Channel Parameters menu for the slot occupied by the modem should be set to Ignore. The V.25 and the modem should be treated as a single logical unit, with all access and display/control to either, being through the V.25 Autodialler slot.

Appendix J Supported Equipment Types

The equipment types listed below are identified automatically by release 01/05/A of the Network 16 controller. Only names are used, for compatibility with existing (numbered) equipment the list shows the equivalent numbers in brackets where appropriate.

If it is necessary to modify the equipment name which appears on the Network 16 screens then this can be done by editing the equipment identity table (menu option 7.4). Some equipment types have multiple entries in this table for different releases of their firmware, all entries should be changed.

Identity	Description	
000	Syncro 24	(4524)
032	Syncro 96	
041	Syncro 96L	
048	Syncro 48D	
128	Syncro 96FT	(4596FP)
137	Syncro 96FTL	(4596FPLL)
160	Syncro 1496	(4532)
192	Mayze 2426EP	(4624DLI)
224	Mayze 24	(4624)
240	Mayze 96	(4696)
272	Klink 96	(4500 LinkB)
320	Mayze 2426	(4624)
336	Mayze 9626	(4696)
352	Mayze 24EP	(4624DLI)
368	Mayze 96EP	(4696DLI)
416	Javelin 640	(4364LDM)
441	Syncro 192L	
546	Quantum 96	
562	Quantum 144	
576	Quattro 144	
592	Quattro 288	
608	Syncro 192FDX	
656	QSM 288	

672	QSM 144
976	ISDN TA Plus

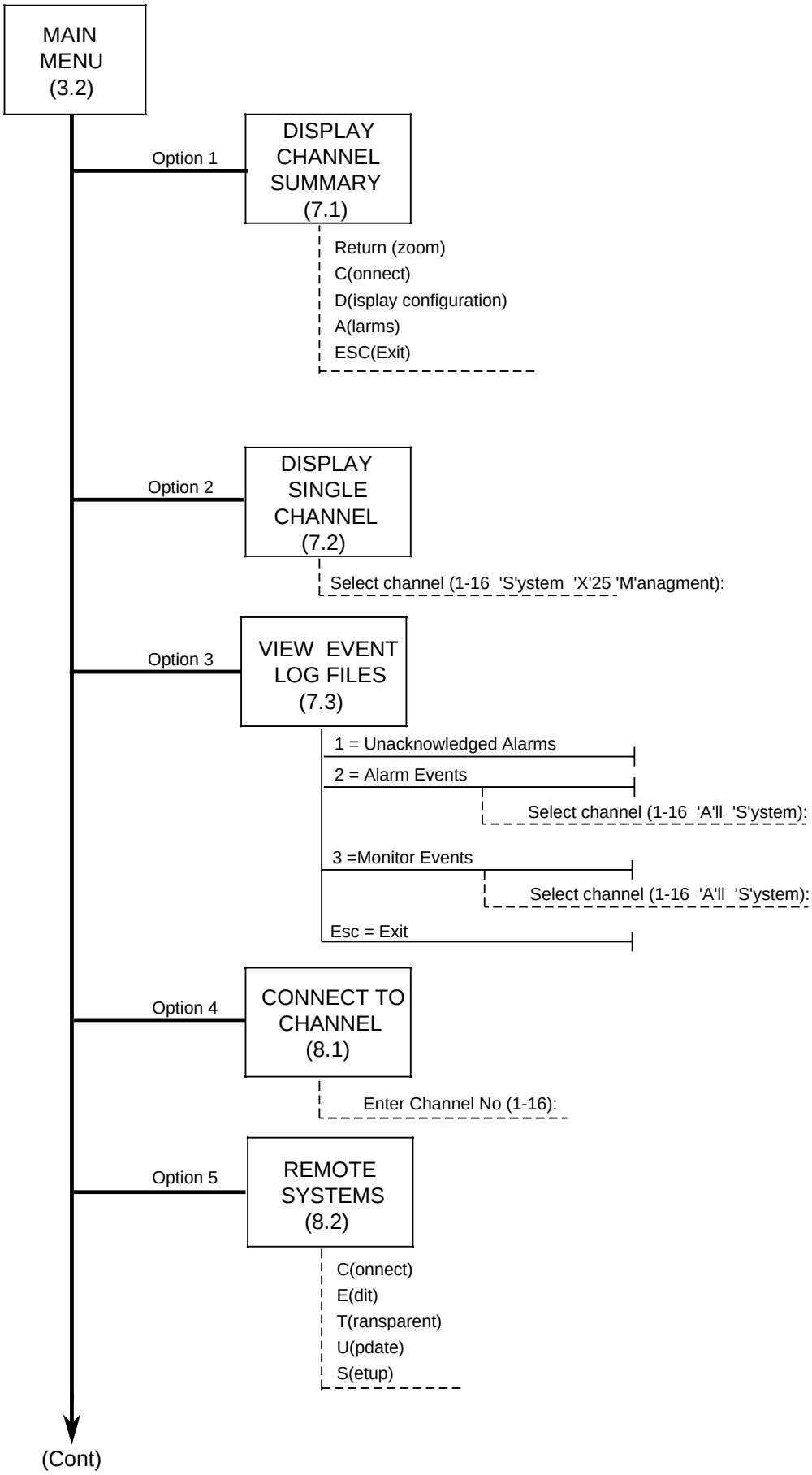
Quick Cross Reference:

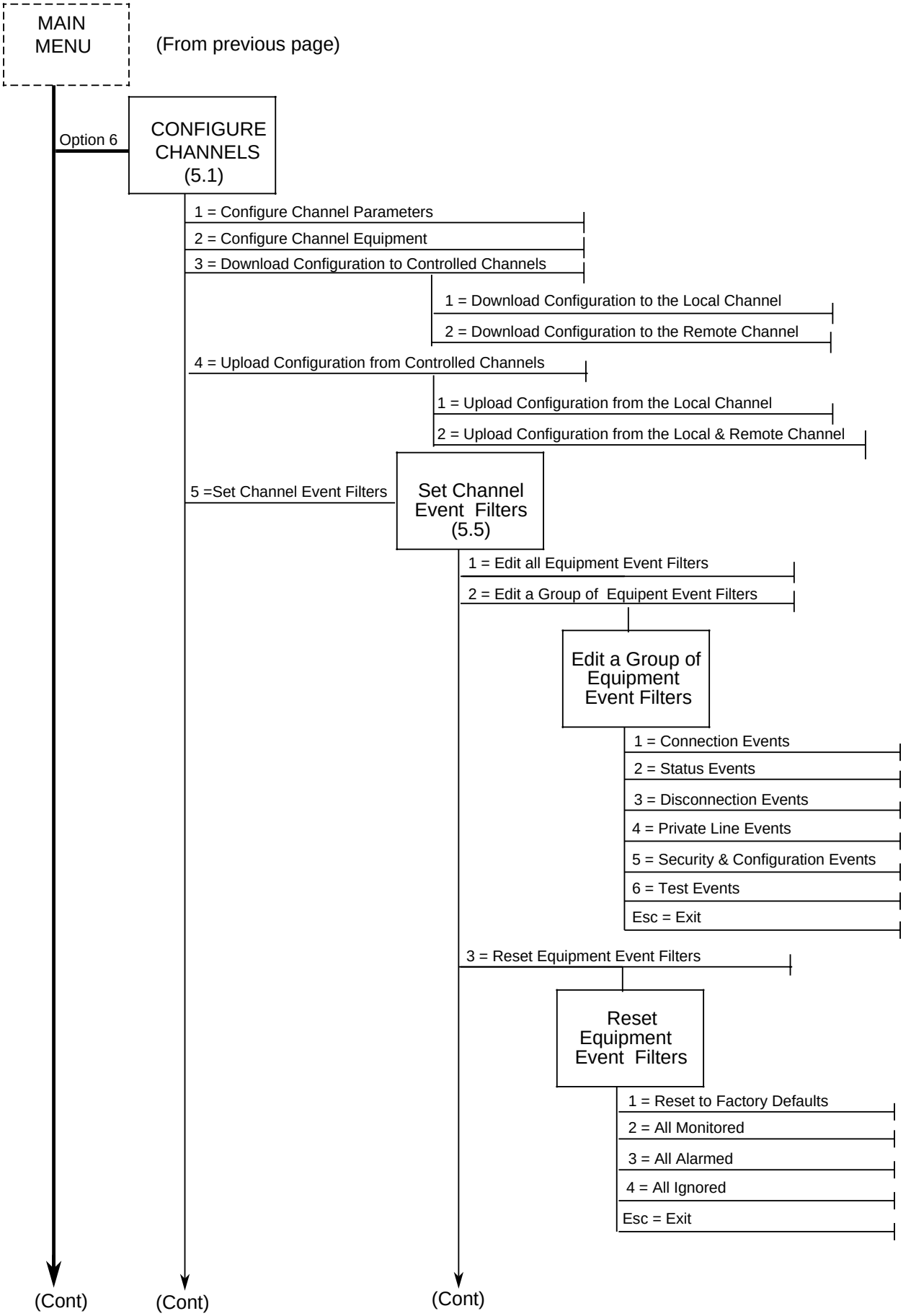
Number	**Name**
4364LDM	Javelin 640
4500 LinkB	Klink 96
4524	Syncro 24
4532	Syncro 1496
4596FP	Syncro 96FT
4596FPLL	Syncro 96FTL
4624	Mayze 24
4624	Mayze 2426
4624DLI	Mayze 2426EP
4624DLI	Mayze 24EP
4696	Mayze 96
4696	Mayze 9626
4696DLI	Mayze 96EP

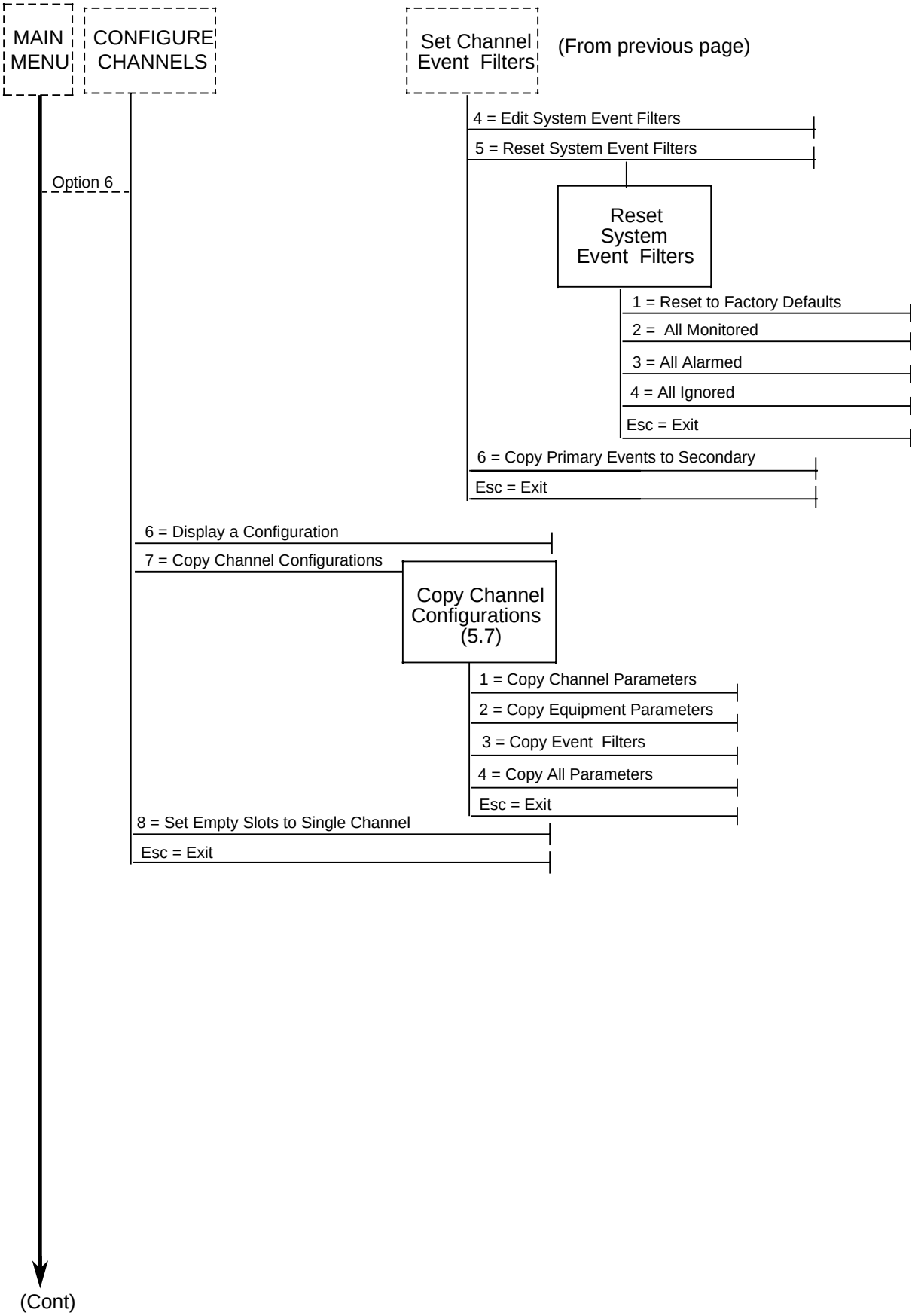
Appendix K Menu Flow Diagrams

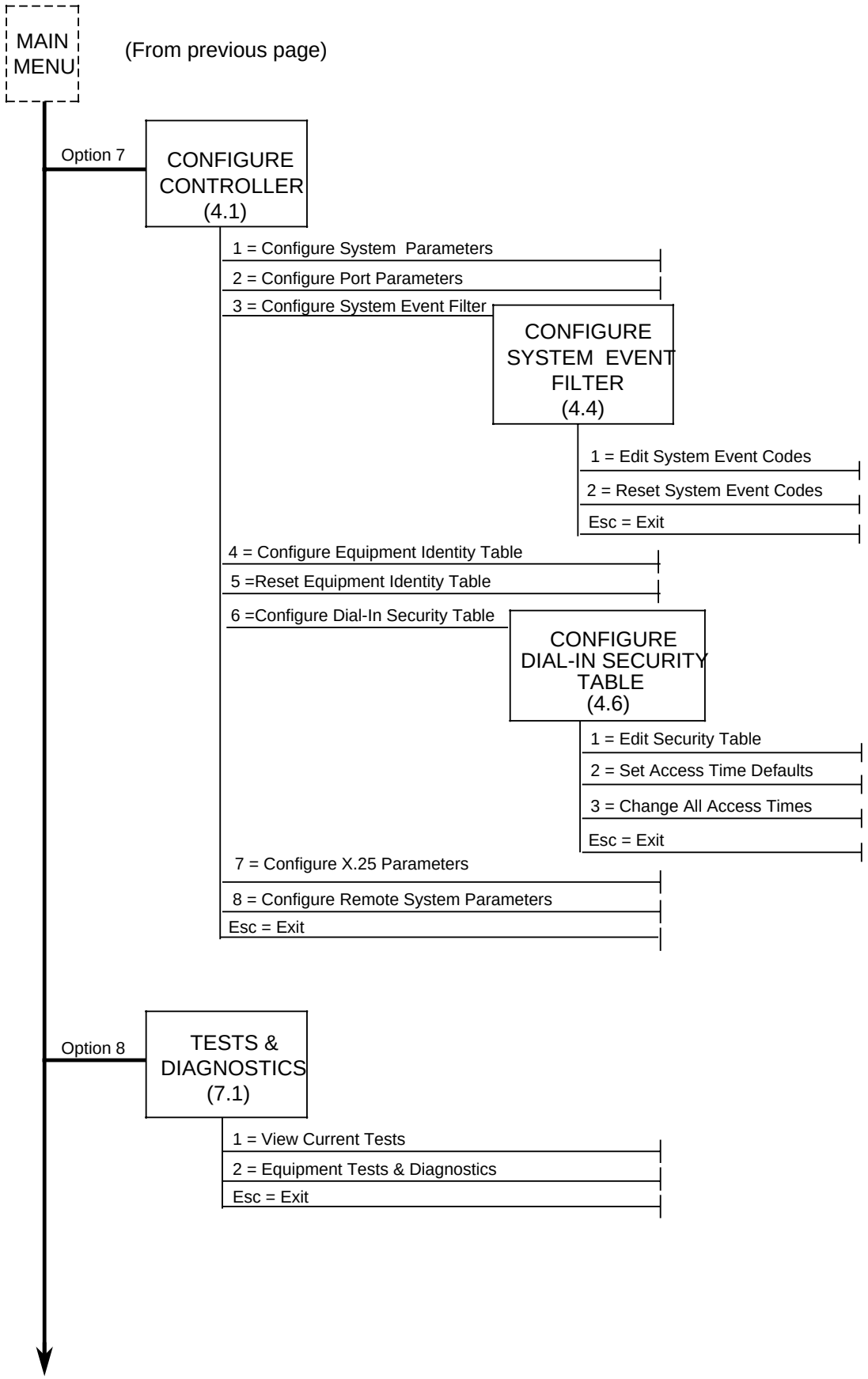
In the set of diagrams on the following pages, options available at 'User' level are shown in heavy lines.

The numbers in the boxes refer to the sections in the manual where the menus are described.


MAIN MENU (3.2)
Option 1
DISPLAY CHANNEL SUMMARY (7.1)
Return (zoom)
C(onnect)
D(isplay configuration)
A(larms)
ESC(Exit)
Option 2
DISPLAY SINGLE CHANNEL (7.2)
Select channel (1-16 'S'ystem 'X'25 'M'anagment):
Option 3
VIEW EVENT LOG FILES (7.3)
1 = Unacknowledged Alarms
2 = Alarm Events
Select channel (1-16 'A'll 'S'ystem):
3 =Monitor Events
Select channel (1-16 'A'll 'S'ystem):
Esc = Exit
Option 4
CONNECT TO CHANNEL (8.1)
Enter Channel No (1-16):
Option 5
REMOTE SYSTEMS (8.2)
C(onnect)
E(dit)
T(ransparent)
U(pdate)
S(etup)
(Cont)


MAIN MENU
(From previous page)
Option 6
CONFIGURE CHANNELS (5.1)
1 = Configure Channel Parameters
2 = Configure Channel Equipment
3 = Download Configuration to Controlled Channels
1 = Download Configuration to the Local Channel
2 = Download Configuration to the Remote Channel
4 = Upload Configuration from Controlled Channels
1 = Upload Configuration from the Local Channel
2 = Upload Configuration from the Local & Remote Channel
5 =Set Channel Event Filters
Set Channel Event Filters (5.5)
1 = Edit all Equipment Event Filters
2 = Edit a Group of Equipent Event Filters
Edit a Group of Equipment Event Filters
1 = Connection Events
2 = Status Events
3 = Disconnection Events
4 = Private Line Events
5 = Security & Configuration Events
6 = Test Events
Esc = Exit
3 = Reset Equipment Event Filters
Reset Equipment Event Filters
1 = Reset to Factory Defaults
2 = All Monitored
3 = All Alarmed
4 = All Ignored
Esc = Exit
(Cont)
(Cont)
(Cont)


MAIN MENU
CONFIGURE CHANNELS
Set Channel Event Filters
(From previous page)
4 = Edit System Event Filters
5 = Reset System Event Filters
Option 6
Reset System Event Filters
1 = Reset to Factory Defaults
2 = All Monitored
3 = All Alarmed
4 = All Ignored
Esc = Exit
6 = Copy Primary Events to Secondary
Esc = Exit
6 = Display a Configuration
7 = Copy Channel Configurations
Copy Channel Configurations (5.7)
1 = Copy Channel Parameters
2 = Copy Equipment Parameters
3 = Copy Event Filters
4 = Copy All Parameters
Esc = Exit
8 = Set Empty Slots to Single Channel
Esc = Exit
(Cont)


MAIN MENU
(From previous page)
Option 7
CONFIGURE CONTROLLER (4.1)
1 = Configure System Parameters
2 = Configure Port Parameters
3 = Configure System Event Filter
CONFIGURE SYSTEM EVENT FILTER (4.4)
1 = Edit System Event Codes
2 = Reset System Event Codes
Esc = Exit
4 = Configure Equipment Identity Table
5 =Reset Equipment Identity Table
6 =Configure Dial-In Security Table
CONFIGURE DIAL-IN SECURITY TABLE (4.6)
1 = Edit Security Table
2 = Set Access Time Defaults
3 = Change All Access Times
Esc = Exit
7 = Configure X.25 Parameters
8 = Configure Remote System Parameters
Esc = Exit
Option 8
TESTS & DIAGNOSTICS (7.1)
1 = View Current Tests
2 = Equipment Tests & Diagnostics
Esc = Exit